

**BIOLOGY 491: Senior Seminar in Integrative Biology (4 credits) | Topic: Microbial Ecology & Climate Change|  
MW 8:05-9:20 | BSC 210E**

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**Office hours:** Monday 1:30-2:30 PM ET, Thursday 2-3 PM ET, or by appointment

**Course description:** Integrative experience for senior biology majors. Connects knowledge and skills with current interdisciplinary topics within biology. Involves primary literature study and analysis that result in written and oral products. Taught by two members of the biology faculty. Topic depends on the interface of the instructors' expertise and includes: Ecoimmunology, Microbial Ecology, Evolution and Development, Environmental Developmental Biology, Evolutionary Genetics/Genomics, Neurobiology and Behavior, Developmental Neuroscience, Developmental Genetics, Ecology and Evolution of Infectious Diseases, Conservation Genetics. (From the course catalog).

The topic for Biology 491 for Fall 2021 is **MICROBIAL ECOLOGY & CLIMATE CHANGE**.

**Course learning objectives:**

- Construct an understanding of how two subfields of biology are interrelated and how an integrative approach enriches understanding
- Critically analyze scientific evidence and methods in recent primary literature at the intersection of two subfields within biology
- Effectively communicate (written and oral) the connections between the two subfields within biology

**Course organization:** Biology 491 is a small seminar course that uses a 'lab meeting' style of instruction. You, your classmates, and the two faculty members teaching the course will be reading and discussing primary literature related to the theme of the course. The theme is typically an emerging sub-disciplines within the field of biology and the theme fits the intersection of expertise of your two professors. This course will consist of lecture, discussion (faculty- and student-led), student presentations, peer-review of student work, and grant writing.

**Course website:** Canvas website is where you can access course materials, turn in assignments, receive feedback, and view your graded work.

**Workload:** Biology 491 is a 4 credit course with three classroom hours per week. The reading, writing, and research done outside of class is an essential component of this course. Accordingly, there is an expectation of nine hours of work outside of classroom time per week.

**Attendance:** Attendance is necessary for success in this course and we expect students to be present (and on-time!) for every class session.

**Office hours and appointments:** Students are welcome to stop by Dr. Robic (203W) or Dr. Kovacs's (202E) offices during office hours. If you cannot make it during those hours, please send us an email with information about the times you are available to meet and we will do our best to accommodate your schedule.

**Assignment deadlines and policy on late work:** Assignment due dates are outlined in the class schedule. We will accept late work within a week of the deadline, but you will automatically lose 10% of the maximum points per day.

**Course evaluations:** At the end of the semester you will receive an email asking you to submit an evaluation of the course. Please give feedback! Your input is very important to the college as a whole and to us as faculty members. We take your comments very seriously.

**ADA:** Agnes Scott College seeks to provide equal access to its programs, services, and activities for people with various abilities. If you will need accommodations in this class, please contact the Office of Academic Advising and Accessible Education (404-471-6150) to complete the registration process. Once registered, please contact me so we can discuss the specific accommodations needed for this course.

**Title IX:** “Agnes Scott is hereto help you if you have experienced any form of sexual harassment or violence, dating ordomestic violence, or stalking. Please talk to any faculty or staff member with whom you feel comfortable. Faculty and staff members want to support you and have been trained to help. They will also inform the Title IX office so that you learn about options available to you. If you do not want college administrators to know what you have experienced,you may talk to the chaplain, as well as nurses or counselors in the WellnessCenter with complete confidentiality. They will not tell anyone what you share with them unless you give your express permission. You may contact the Title IX Coordinator directly at T9Coordinator@agnesscott.edu.”

**Inclusion:** This course adheres to the principles of diversity and inclusion integral to the Agnes Scott community. We respect people from all backgrounds and recognize the differences among our students, including racial and ethnic identities, religious practices, and gender expressions. We strive for our campus to be a safe space in which all students feel acknowledged and supported. At the same time, we understand that course content, critical inquiry, and classroom dialogues give us opportunities to examine topics from a variety of perspectives. Such discourse is a defining feature of a liberal arts education, and can compel debates that challenge beliefs and positions, sometimes causing discomfort, especially around issues related to personal identities. While we uphold and preserve the tenets of academic freedom, we request and invite your thoughtful and constructive feedback on ways that we can, as a community of learners, respectfully assist and challenge one another in our individual and collective academic work.

**Academic honesty:** The Agnes Scott College honor code embodies an ideal of character, conduct, and citizenship, and is an important part of the College’s mission and core identity. This applies especially to academic honesty and integrity. Passing off someone else’s work as your own represents intellectual fraud and theft, and violates the core values of our academic community. To be honorable, you should understand not only what counts as academic dishonesty, but also how to avoid engaging in these practices. You should:

- review each course syllabus for the professor’s expectations regarding course work and class attendance.
- attribute all ideas taken from other sources; this shows respect for other scholars. Plagiarism can include portraying another’s work or ideas as your own, buying a paper online and turning it in as if it were your own work, or not citing or improperly citing references on a reference page or within the text of a paper.

- not falsify or create data and resources or alter a graded work without the prior consent of your professor. This includes making up a reference for a works cited page or making up statistics or facts for academic work.
- not allow another party to do your work/exam, or submit the same or similar work in more than one course without permission from the course instructors. Cheating also includes taking an exam for another person, looking on another person's exam for answers, using exams from previous classes without permission, or bringing and using unauthorized notes or resources (i.e., electronic, written, or otherwise) during an exam.
- not facilitate cheating, which can happen when you help another student complete a take home exam, give answers to an exam, talk about an exam with a student who has not taken it, or collaborate with others on work that is supposed to be completed independently.
- be truthful about the submission of work, which includes the time of submission and the place of submission (e.g., e-mail, online, in a mailbox, to an office, etc.).

You should understand that penalties result from dishonest conduct, ranging from failure of the assignment to expulsion from the college. You should speak with your professors if you need clarification about any of these policies.

### **Grading and points breakdown:**

Graded item	#	Points	Category total	Percentage of Course
GRFP presentation	1	40	40	10%
GRFP written proposal	1	100	100	25%
GRFP peer-review	2	20	40	10%
Paper discussion prep assignments	8	10	80	20%
Personal statement	1	30	30	7.5%
Cover letter	1	30	30	7.5%

Discussion leading	2	25	50	12.5%
Classroom engagement		30	30	7.5%
TOTAL			400	100%

The professors may make small adjustments to this breakdown during the semester. Details on each assignment will be provided well in advance of deadlines.

The following grading scale will apply for converting numerical grades into final letter grades:

93 to 100: A  
90 to 92.9: A-  
87 to 89.9: B+  
83 to 86.9: B

80 to 82.9: B-  
77 to 79.9: C+  
73 to 76.9: C  
70 to 72.9: C-

67 to 69.9: D+  
63 to 66.9: D  
60 to 62.9: D-  
Lower than 59.9: F

**GRFP proposal presentation and written proposal:** The National Science Foundation (NSF) funds Graduate Research Fellowships that give graduate students sizable stipends and release them from serving as a teaching assistant for three years of their Ph.D. program. This Graduate Research Fellowship Program (GRFP) is highly competitive, and students can apply as seniors in college and in their first two years in graduate school. Students do not need to do the project they propose, this is more an

exercise in identifying a gap in the research and proposing an exciting, feasible project. Applications are evaluated based on a 2-page research proposal, a personal statement, optional GRE scores, letters of recommendation, and transcripts. In Biology 491, you will be developing a research proposal related to our theme of microbial ecology and climate change. You will first present that idea to the class in a lab-meeting style presentation (10 minutes) in order to get feedback on your ideas and study design. Then you will prepare the 2-page research proposal according to the guidelines of the NSF GRFP. Guidelines from NSF can be found on Canvas.

**Paper selection and discussion leading:** Two times during the semester, you will be responsible for leading a discussion on the assigned primary literature for the day.

The first time you will do this in a group of four or five. This paper presentation will be on a recent review paper. For this presentation you will not be expected to present the entire paper, but rather provide a general overview of the review topic and then each member will briefly present on a section of the review that they thought was relevant to their research interests or to the class in general. Your group will then be expected to guide the class discussion of the paper.

The next time, you will work in pairs to select a primary literature paper that relates directly to your GRFP proposals. Drs. Robic and Kovacs will help you pair up with another class member who is researching something similar to you. For this presentation, you will give a short presentation/outline of the paper at the beginning of the discussion and help guide the conversation about the content of the paper.

For both presentation assignments, the entire class will be assigned the reading before class along with a paper discussion prep assignment. The paper discussion prep assignment will help discussion leaders, as these assignments are designed to help generate discussion.

**Paper discussion prep assignments:** We will be reading a substantial amount of primary literature papers over the course of the semester. To aid in lively and informed discussion, there will typically be some short assignment that should be completed prior to coming to class, and submitted to Canvas. Exact details will be available on Canvas. For example, for one paper you might upload three discussion questions to Canvas. For another, you might be asked to critique the study.

### Biology 491 Schedule

DATE	Readings/Assignments
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<b>M-Aug 23</b>	<b>Welcome to Senior Seminar</b>	
<b>W-Aug 25</b>	What are microbiomes and why should we care Ecology as a framework for scientific inquiry	Read papers on Canvas
<b>M-Aug 30</b>	Big Theme 1: Microbiomes and Health	Read papers on Canvas, submit PDP1 prior to class
<b>W-Sept 1</b>	Brainstorm research questions	Turn in draft research questions after class (5 pts)
<b>M-Sept 6</b>	<b>LABOR DAY HOLIDAY – NO CLASSES</b>	
<b>W-Sept 8</b>	BigTheme 2: Microbiomes and the Environment	Read papers on Canvas, submit PDP2 prior to class Eman Kwaja - zoom visit at 8:50
<b>M-Sept 13</b>	Intro to GRFP, hearing from recent winners	Read example GRFPs and short guide to writing an NSF proposal
<b>W-Sept 15</b>	GRFP Idea workshoping	
<b>M-Sept 20</b>	In-class review and workshoping of Specific Aims (Bring in your CV or resume to class)	Submit draft of Specific Aims ( 5 pts) Due at midnight
<b>W-Sept 22</b>	No Class. Instead, attend the Thursday career session of Women and Climate Change at 6pm!	Submit one page draft of personal statement (10 pts). Due at midnight
<b>M-Sept 27</b>	Library Research Methods - Casey Long (Meet in McCain 211)	
<b>W-Sept 29</b>	Student-led paper discussion (two teams of 4-5)	
<b>M-Oct 4</b>	Student-led paper discussion (two team of 4-5)	PDP3,4 Answer Questions about the two papers you have not read/presented

<b>W-Oct 6</b>	What makes a “good” research question? Microbial Ecology Research Methods Discussion	
<b>M-Oct 11</b>	<b>FALL BREAK – NO CLASSES</b>	
<b>W-Oct 13</b>	<b>FALL BREAK – NO CLASSES</b>	
<b>M-Oct 18</b>	No class	Submit annotated bibliography (10 pts ) You need to have 10 references!
<b>W-Oct 20</b>	Choose papers for student presentations	PDP6
<b>M-Oct 25</b>	Student-led paper discussions (two groups of two)	PDP7
<b>W-Oct 27</b>	Student-led paper discussions (two groups of two)	PDP8
<b>M-Nov 1</b>	Student-led paper discussions (two groups of two)	Submit GRFP Draft (30 pts)
<b>W-Nov 3</b>	NO CLASS-Field trip Nov 6th-	<b>Field Trip on Saturday Nov 6th</b>
<b>M-Nov 8</b>	Student-led presentations	
<b>W-Nov 10</b>	GRFP Mini Presentations	Submit GRFP peer review
<b>M-Nov 15</b>	GRFP Mini Presentations	
<b>W-Nov 17</b>	GRFP Mini Presentations	
<b>M-Nov 22</b>	GRFP Mini Presentations	
<b>W-Nov 24</b>	<b>THANKSGIVING BREAK – NO CLASSES</b>	
<b>M-Nov 29</b>	Guest Speaker (Microbial Ecology Related (non-academic)	



<b>W-Dec 1</b>	Guest Speaker (Grad School Related)	Submit final GRFP (50 pts)
<b>M-Dec 6</b>	<b>Senior Seminar Celebration</b>	