BI410/510: Microbial Ecology  
CRN: 31095/3111  
Mon & Wed 12:15-1:45 via Zoom

Dr. Krista McGuire (she, her, hers)  
Virtual office hours: Thu 2:30-4:30; by appointment  
kmcguire@uoregon.edu  
https://mcguiremicrobialecology.com/

**Course Description:** Microbial ecology is the study of the relationships of microbes with their biotic and abiotic environment and interactions with each other. In this course you will explore current and classic topics in microbial ecology through lectures, discussions, and the primary literature. For each class, students will read primary literature articles related to the topic and will write a short response in the discussion section of Canvas in response to posted questions. The class format will include a short lecture and overview of the theory or ecological system highlighted for the current week, and the remainder of the class will be discussion-based. There is a take-home midterm and at the end of the term, students will write a research proposal for an experimental study in a system of their choice that is designed to test one or more hypotheses in microbial ecology. You will be assigned two of your classmate’s proposals to perform a peer review and you will have the opportunity to revise your own proposal based on the reviews you receive back from your peers. Graduate students taking the course will lead two discussions of the primary literature and will be required to submit a slightly longer proposal at the end of the term.

**Learning Objectives:**

Students who complete this course will be able to:

1. Apply general ecological principles to microbial systems
2. Articulate the ecological mechanisms that shape microbial communities across a variety of habitats
3. Read, synthesize, and analyze primary scientific literature in microbial ecology
4. Devise an experimental test of ecological principles in microbial communities through independent work
5. Learn how to craft a compelling research proposal
6. Communicate scientific ideas in both oral and written form

**Grading:** Total of 450 points for the course

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Discussion posts</td>
<td>75</td>
</tr>
<tr>
<td>Take-home exam</td>
<td>100</td>
</tr>
<tr>
<td>Literature review</td>
<td>20</td>
</tr>
<tr>
<td>Proposal abstract</td>
<td>25</td>
</tr>
<tr>
<td>Final proposal</td>
<td>100</td>
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<tr>
<td>Presentation of proposal</td>
<td>100</td>
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<tr>
<td>Peer review</td>
<td>30</td>
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</tbody>
</table>

**TOTAL 450**
Special needs: Please notify me in the first week of the course if you have special needs or a documented disability that will interfere with your ability to perform course activities.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Reading(s) for discussion</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29-Mar</td>
<td>Introductions and overview of microbial ecology and methods</td>
<td>Xu 2006; Antwis et al. 2017</td>
<td></td>
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<tr>
<td></td>
<td>31-Mar</td>
<td>Bacteria: form and function</td>
<td>Ho et al. 2017</td>
<td>Discussion post</td>
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<tr>
<td>2</td>
<td>5-Apr</td>
<td>Fungi: form and function</td>
<td>Zanne et al. 2019</td>
<td>Discussion post; collections of 5 fungi</td>
</tr>
<tr>
<td></td>
<td>7-Apr</td>
<td>Microbial interactions: synergy</td>
<td>Tan et al. 2017</td>
<td>Discussion post</td>
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<tr>
<td>3</td>
<td>12-Apr</td>
<td>Microbial interactions: antagonism</td>
<td>Hibbing et al. 2010</td>
<td>Discussion post</td>
</tr>
<tr>
<td></td>
<td>14-Apr</td>
<td>Microbial dispersal</td>
<td>Caliz et al. 2018</td>
<td>Discussion post</td>
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<tr>
<td>4</td>
<td>19-Apr</td>
<td>Colonization and succession</td>
<td>Rao et al. 2021</td>
<td>Discussion post</td>
</tr>
<tr>
<td></td>
<td>21-Apr</td>
<td>Linking microbial structure and function</td>
<td>Bier et al. 2015</td>
<td>Discussion post</td>
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<tr>
<td>5</td>
<td>26-Apr</td>
<td>Microbial mutualisms 1: animal systems</td>
<td>Amato et al. 2019</td>
<td>Discussion post</td>
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<tr>
<td></td>
<td>28-Apr</td>
<td>Microbial mutualisms 2: plant systems</td>
<td>Liu et al. 2018</td>
<td>Discussion post; literature review</td>
</tr>
<tr>
<td>6</td>
<td>3-May</td>
<td>Microbial responses to climate change</td>
<td>Zhou et al. 2018</td>
<td>Discussion post</td>
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<td></td>
<td>5-May</td>
<td>Terrestrial ecosystems</td>
<td>Fierer 2017</td>
<td>Discussion post; take-home exam</td>
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<tr>
<td>7</td>
<td>10-May</td>
<td>Aquatic ecosystems</td>
<td>Amaral-Zettler et al. 2020</td>
<td>Discussion post</td>
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<tr>
<td></td>
<td>12-May</td>
<td>Agricultural ecosystems</td>
<td>Toju et al. 2018</td>
<td>Discussion post; Proposal abstract</td>
</tr>
<tr>
<td>8</td>
<td>17-May</td>
<td>Urban ecosystems</td>
<td>Fulthorpe et al. 2018</td>
<td>Discussion post</td>
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<tr>
<td></td>
<td>19-May</td>
<td>Applied microbial ecology</td>
<td>Said &amp; Or 2017</td>
<td>Discussion post</td>
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<tr>
<td>9</td>
<td>24-May</td>
<td>Student proposal presentations</td>
<td></td>
<td>Final proposal</td>
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<tr>
<td></td>
<td>26-May</td>
<td>Student proposal presentations</td>
<td></td>
<td></td>
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<tr>
<td>10</td>
<td>31-May</td>
<td>Memorial Day No Classes</td>
<td></td>
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<tr>
<td></td>
<td>2-Jun</td>
<td>Student proposal presentations</td>
<td></td>
<td>Proposal reviews and revised proposal</td>
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Assigned readings for discussions


Campus resources to support your learning

*Tutoring and Academic Engagement Center* [https://engage.uoregon.edu/services/] Drop-in math and writing support in addition to tutoring, study skills support, and Class Encore. Located in the 4th Floor Knight Library (541) 346-3226, engage@uoregon.edu.

*Counseling Center* Call anytime to speak with a therapist who can provide support and connect you with resources. Located on the 2nd Floor of the Health Center (541) 346-3227

*Accessible Education Center* The University of Oregon is working to create inclusive learning environments. The instructor believes strongly in creating inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your participation, please notify us as soon as possible. You are also encouraged to contact the Accessible Education Center. If you are not a student with a documented disability, but you would like for us to know about class issues that will impact your ability to learn, we encourage you to come visit during office hours so that we can strategize how you can get the most out of this course. Located on the 1st Floor of Oregon Hall (541) 346-1155, uoaec@uoregon.edu

*Center for Multicultural Academic Excellence (CMAE)* mission is to promote student retention and persistence for historically underrepresented and underserved populations. We develop and implement programs and services that support retention, academic excellence, and success at the UO and beyond. We reaffirm our commitment to all students, including undocumented and tuition equity students. Located on the 1st Floor of Oregon Hall (541) 346-3479, cmae@uoregon.edu

*The UO Access Shuttle* is an on-campus ride service provided at no cost to students with conditions that limit mobility. More information and a sign-up form can be found on the parking & transportation department website: [https://parking.uoregon.edu/content/access-shuttle](https://parking.uoregon.edu/content/access-shuttle).

**Class Courtesy**
Please arrive in class on time. Late arrivals distract the instructor and the other students. Please turn off cell phones during the class meeting times. Use your laptop only for class activities. Do not leave class early unless you have cleared it with the instructor in advance. Ask questions if you did not hear or understand something.

Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the quarter (or before) so that I may address you properly.

Open inquiry, freedom of expression, and respect for difference are fundamental to a comprehensive and dynamic education. We are committed to upholding these ideals by encouraging the exploration, engagement, and expression of divergent perspectives and diverse identities. Classroom courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Our classroom is a learning environment, and as such should be a safe, inclusive and respectful place. Being respectful also includes using preferred pronouns for your classmates. Disrespecting fellow students as well as combative approaches, tones and/or actions are not acceptable. Please make me aware if there are classroom dynamics that impede your (or someone else’s) full engagement.

**Academic integrity**
All students will be expected to adhere to the University’s guidelines on academic integrity as outlined in the Student Conduct Code: [https://policies.uoregon.edu/vol-3-administration-student-affairs/ch-1-conduct/student-conduct-code](https://policies.uoregon.edu/vol-3-administration-student-affairs/ch-1-conduct/student-conduct-code). As detailed in the policy, academic misconduct means the violation of university policy involving academic integrity. This includes cheating (“any act of deception by which a student misrepresents or misleadingly demonstrates that the student has mastered information on an academic exercise that the student has not mastered”), and plagiarism (“using the ideas or writings of
another as one’s own.”) The instructor has a zero tolerance policy for academic dishonesty. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures.

**Discrimination and Harassment**

*Prohibited Discrimination and Harassment*

Any student who has experienced sexual assault, relationship violence, sex or gender-based bullying, stalking, and/or sexual harassment may seek resources and help at [safe.uoregon.edu](http://safe.uoregon.edu). To get help by phone, a student can also call either the UO’s 24-hour hotline at 541-346-7244 [SAFE], or the non-confidential Title IX Coordinator at 541-346-8136. From the SAFE website, students may also connect to Callisto, a confidential, third-party reporting site that is not a part of the university.

Students experiencing any other form of prohibited discrimination or harassment can find information at [respect.uoregon.edu](http://respect.uoregon.edu) or [aaeo.uoregon.edu](http://aaeo.uoregon.edu) or contact the non-confidential AAEO office at 541-346-3123 or the Dean of Students Office at 541-346-3216 for help. As UO policy has different reporting requirements based on the nature of the reported harassment or discrimination, additional information about reporting requirements for discrimination or harassment unrelated to sexual assault, relationship violence, sex or gender based bullying, stalking, and/or sexual harassment is available at [Discrimination & Harassment](http://titleix.uoregon.edu).

**Reporting**

The instructor of this class is a Student-Directed Employee. As such, if you disclose to me, I will respond to you with respect and kindness. I will listen to you, and will be sensitive to your needs and desires. I will not judge you. I will support you. As part of that support, I will direct students who disclose sexual harassment or sexual violence to resources that can help. I will only report the information shared to the university administration when you as the student requests that the information be reported (unless someone is in imminent risk of serious harm or is a minor). Please note the difference between ‘privacy’ and ‘confidentiality.’ As a Student-Directed Employee I can offer privacy because I am not required to report certain information to the university. However, I cannot be bound by confidentiality in the same way that a counselor or attorney is. Confidential resources such as these means that information shared is protected by federal and state laws. Any information that I as a student-directed employee receive may still be accessed by university or court proceedings. This means, for example, that I could still be called as a witness or required to turn over any related documents or notes that I keep.

Please note also that I am required to report all other forms of prohibited discrimination or harassment to the university administration. Specific details about confidentiality of information and reporting obligations of employees can be found at [titleix.uoregon.edu](http://titleix.uoregon.edu).

**Mandatory Reporting of Child Abuse**

UO employees, including faculty, staff, and GEs, are mandatory reporters of child abuse. Child abuse pertains to individuals who are under the age of 18. This statement is to advise you that your disclosure of information about child abuse to the instructor may trigger my duty to report that information to the designated authorities. Please refer to the following links for detailed information about mandatory reporting: [Mandatory Reporting of Child Abuse and Neglect](http://titleix.uoregon.edu).

**Safe Ride**

541-346-7433 ext 2

[pages.uoregon.edu/saferide](http://pages.uoregon.edu/saferide)

Safe Ride is an assault prevention shuttle that works to provide free, inclusive, and accessible alternatives to traveling alone at night for UO students, faculty, and staff.

We are a schedule-ahead service and riders can (1) call once we open to schedule a ride with a dispatcher or (2) leave a voicemail on the day of their ride request. We do not call riders ahead of time to confirm due to capacity constraints, but riders are always welcome to call us to double-check that their
ride was scheduled. We are a feminist, ‘for-the-students/by-the-students’ organization and operate out of the Women’s Center in EMU 12F.

Operating hours:
**Spring term**
Sunday - Thursday | 7p - midnight
Friday + Saturday | 7p - 2a

**Summer term**
Sunday - Thursday | 9p - midnight
Friday + Saturday | 9p - 2a

**Fall/Winter term**
Sunday - Thursday | 6p - midnight
Friday + Saturday | 6p - 2a

Policy and rules:
1. We are a **schedule-ahead service, we do not call ahead**, and we can only wait for riders for 5 minutes at their pick-up time and location.
2. We only give rides to groups of **3 or fewer** to prioritize groups that are at higher risk.
3. We are a **free service** and do not accept tips.

**Mental Health and Wellness**

Life at college can be very complicated. Students often feel overwhelmed or stressed, experience anxiety or depression, struggle with relationships, or just need help navigating challenges in their life. If you're facing such challenges, you don't need to handle them on your own—there's help and support on campus.

As your instructor if I believe you may need additional support, I will express my concerns, the reasons for them, and refer you to resources that might be helpful. It is not my intention to know the details of what might be bothering you, but simply to let you know I care and that help is available. Getting help is a courageous thing to do—for yourself and those you care about.

University Health Services help students cope with difficult emotions and life stressors. If you need general resources on coping with stress or want to talk with another student who has been in the same place as you, visit the Duck Nest (located in the EMU on the ground floor) and get help from one of the specially trained Peer Wellness Advocates. Find out more at [health.uoregon.edu/ducknest](http://health.uoregon.edu/ducknest).

University Counseling Services (UCS) has a team of dedicated staff members to support you with your concerns, many of whom can provide identity-based support. All clinical services are free and confidential. Find out more at [counseling.uoregon.edu](http://counseling.uoregon.edu) or by calling 541-346-3227 (anytime UCS is closed, the After-Hours Support and Crisis Line is available by calling this same number).