BI410/510: Microbial Ecology
Mon & Wed 4:00 – 5:20 via Zoom

Dr. Krista McGuire (she, her, hers)
Virtual office hours: Thu 2:30-3:30; by appointment
kmcguire@uoregon.edu
https://mcguiremicrobialecology.com/

Course Description: In this course you we will explore current approaches in microbial ecology for testing hypotheses using experimental approaches. Most studies in microbial ecology are descriptive, as we are still uncovering community assembly patterns of microbial communities in a variety of ecosystems that are still largely undescribed. However, in many systems that are now well characterized, experiments can be done to elucidate the mechanisms underlying microbial community assembly patterns and links between structure and function. For each class, students will read primary literature articles describing an experimental study on the topic for that class. The class format will include a brief overview of the theory or system highlighted for the current week, and the remainder of the class will be discussion-based. Students will also be able to choose one class in which they choose the system and papers for discussion. 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.

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 300 points for the course

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tbody>
<tr>
<td>Discussion leading</td>
<td>30</td>
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<tr>
<td>Participation</td>
<td>50</td>
</tr>
<tr>
<td>Proposal abstract</td>
<td>20</td>
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<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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TOTAL 300

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>Background reading(s)</th>
<th>Due</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>30-Mar</td>
<td>Introductions and overview of microbial ecology and methods</td>
<td>Xu 2006; Jessup 2004</td>
<td>Topic assignments</td>
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<tr>
<td></td>
<td>1-Apr</td>
<td>Colonization and succession</td>
<td>Fierer et al. 2010</td>
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<tr>
<td>2</td>
<td>6-Apr</td>
<td>Microbial dispersal</td>
<td>Nemergut et al. 2013</td>
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<td></td>
<td>8-Apr</td>
<td>Microbial interactions: synergy</td>
<td>Tan et al. 2017</td>
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<td>3</td>
<td>13-Apr</td>
<td>Microbial interactions: antagonism</td>
<td>Hibbing et al. 2010</td>
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<td></td>
<td>15-Apr</td>
<td>Microbial mutualisms 1: animal systems</td>
<td>Costello et al. 2012</td>
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<td>4</td>
<td>20-Apr</td>
<td>Microbial mutualisms 2: plant systems</td>
<td>Friesen et al. 2011</td>
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<td></td>
<td>22-Apr</td>
<td>Linking microbial structure and function: C &amp; N cycling</td>
<td>Bell 2019; Falkowski et al. 2008</td>
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<td>5</td>
<td>27-Apr</td>
<td>Microbial responses to climate change 1: precipitation</td>
<td>Zhou et al. 2018</td>
<td>Proposal abstract</td>
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<td></td>
<td>29-Apr</td>
<td>Microbial responses to climate change 2: temperature</td>
<td>Cavicchioli et al. 2019</td>
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<td>6</td>
<td>4-May</td>
<td>Terrestrial ecosystems</td>
<td>Fierer 2017</td>
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<td></td>
<td>6-May</td>
<td>Marine ecosystems</td>
<td>Strom 2008; Richards et al. 2012</td>
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<td>7</td>
<td>11-May</td>
<td>Freshwater ecosystems</td>
<td>Zeglin 2015</td>
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<td></td>
<td>13-May</td>
<td>Agricultural ecosystems</td>
<td>Toju et al. 2018</td>
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<td>8</td>
<td>18-May</td>
<td>Urban ecosystems</td>
<td>Fulthorpe et al. 2018</td>
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<td></td>
<td>20-May</td>
<td>Microbial applications: bioremediation</td>
<td>Jacob et al. 2018</td>
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<td>9</td>
<td>25-May</td>
<td>Synthetic microbial communities</td>
<td>Zomorrodi et al. 2016</td>
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<td></td>
<td>27-May</td>
<td>Student proposal presentations</td>
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<tr>
<td>10</td>
<td>1-Jun</td>
<td>Student proposal presentations</td>
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<td></td>
<td>3-Jun</td>
<td>Student proposal presentations</td>
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<td>Final proposal</td>
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Assigned readings for background


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.

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://discrimination.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://mandatoryreporting.uoregon.edu).
Safe Ride
541-346-7433 ext 2
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.