**Biology 4935: Research Perspectives**  
**Course Syllabus: Fall 2020**

**Instructor:** Dr. Gina Lewin [glewin@wustl.edu](mailto:glewin@wustl.edu) (she/her/hers)  
**Time:** Tuesdays 17:00 to 18:50  
**Location:** Fully remote, synchronous. Zoom link will be provided.

**Course Description:**
As scientists, we have to produce and analyze data using methods that are reproducible and controlled. And none of that careful work is meaningful without communicating our findings to other scientists, and beyond the walls of academia. This semester, our class will focus on basic skills that I have found incredibly important in my work as a scientist: reading scientific papers; basic data analysis approaches; and clearly writing about science. Through focusing on these areas, you will learn skills that will help you succeed as a student, as a scientist, and in general throughout your life.

1. **Reading scientific articles carefully and critically.** During approximately half of the classes this semester, we will discuss papers relevant to our research. This semester, we will focus the course around the important and fascinating topic, symbiosis. You will learn to decide what you think the data in a paper show and see if you agree with the author’s interpretations. I have set a specific aspect of the paper to focus on each week, but many weeks, the discussion will be led by students. For each paper you read, think about:
   a. the questions and/or hypotheses the paper addresses
   b. the data the authors use to address the question
   c. the point of each figure
   d. the statistics
   e. the implications to the field as a whole
   f. what would you do differently?
   g. what would you do next?
To facilitate a strong discussion, you should come to each class prepared with a question or idea related to the paper.

2. **Using basic tools to process and interpret data.** We will center these discussions around sequencing and genomics approaches, but many of these methods should be valuable no matter your research focus or career trajectory. We will also emphasize reproducible research, namely how you can track your workflow to prevent mistakes and allow others to repeat your analyses. About half of the weeks of the course, we will discuss these tools. Depending on the tool, these classes will take the form of workshops or student-led tutorials.

3. **Practicing scientific writing.** The best way to get better at writing is practice. You will submit a 300-word essay each week (10 total throughout the semester), whether it be your current research in the lab or an interesting journal article that you have read. However, I prefer that you write about your current research as that will help you maintain a regular record of your progress. Aim to explain your work in the simplest language possible, while not forfeiting scientific rigor.
Please email all assignments, including your weekly 300 words, to Gina Lewin (glewin@wustl.edu) and Joan Strassmann (strassmann@wustl.edu) before class every week. You should also copy your bench mentor so that they have a copy of your responses and a record of your progress.

Learning Objectives:
By the end of the semester, you will be able to:
1. Perform basic data manipulations and sequence analyses using reproducible research techniques
2. Identify relevant and sound scientific papers
3. Understand the literature behind social evolution and symbiosis in microbes
4. Critique the methods and conclusions of a scientific paper
5. Produce high quality scientific writing

Course Content:
There are no required text or materials for this course. All material will be made available online through Canvas.

Grading:
Class participation = 100 points
Weekly writing 10 points each x 10 weeks = 100 points
Total: 200 points

I want you to learn and succeed in this course. Therefore, students can redo any assignments if they would like to improve their grade.

Instructor Availability:
If you have questions about anything (or just want to say hi), I have set aside Mondays from 10:00-11:00 am CT and Thursdays from 12:00-1:00 pm CT to meet virtually over Zoom. The link will be provided. However, I also am available to meet outside of these times, and you can contact me by email or through Canvas to ask a question or schedule a meeting.

Courses Expectations and Guidelines:

Attendance and Active Learning
This course is designed around your active engagement with the material. Although active learning approaches do not always feel as impactful as traditional lecturing, studies have shown again and again that this approach is in fact more effective for learning. Thus, your attendance and participation are key components of the course. In addition, you will be asked to come to class prepared with any reading or pre-class activities complete.

Courses in the time of COVID-19
I recognize that this class is occurring a during time of tremendous uncertainty and challenges. My goal for this class is for you to succeed. While learning in this class requires for you to actively engage with the course material, I am committed to supporting you and

Last Modified Sept 7, 2020
providing flexibility. If you require any accommodations, please reach out to me. In return, I ask that you offer the same support and flexibility to each other and to me.

**Campus Resources for Students:**

**Disability Resources**
Washington At Washington University we strive to make the academic experience accessible and inclusive. If you anticipate or experience barriers based on disability, please contact Disability Resources at 314.935.5970, disabilityresources@wustl.edu, or visit our website for information about requesting academic accommodations. See: https://students.wustl.edu/disability-resources/.

**The Writing Center**
The Writing Center, located in Olin Library, offers free one-on-one writing tutorials to WashU students, as well as workshops designed to help students become better writers. The Writing Center staff can assist by providing feedback on the strength of an argument, clarity, and organization. Contact them at 935-4981 or writing@wustl.edu.

**The Learning Center**
The Learning Center works collaboratively with University partners to provide undergraduate students key resources, like academic peer mentoring, to enhance their academic progress. Contact them at learningcenter.wustl.edu to find out what support they may offer for your classes.

**Mental Health Services**
Mental Health Services' professional staff members work with students to resolve personal and interpersonal difficulties, many of which can affect a student's academic experience. These include conflicts with or worry about friends and family, concerns about eating or drinking patterns, and feelings of anxiety and depression. For more information, visit: www.students.wustl.edu/mental-health-services/.

**Relationship and Sexual Violence Prevention Center (RSVP)**
The Relationship and Sexual Violence Prevention Center (RSVP) offers support for those who have experienced sexual violence, sexual misconduct, dating violence, domestic violence or stalking. RSVP can help those who are not sure what steps they wish to take to respond to their experiences. They offer confidential support and can help arrange for necessary classroom accommodations. To get help, contact the RSVP Center at 935-3445 or rsvpcenter@wustl.edu. Their office is located in Seigle Hall, Suite 435.

**Bias Report and Support System (BRSS)**
The University has a process through which students, faculty, staff, and community members who have experienced or witnessed incidents of bias, prejudice, or discrimination against a student can report their experiences to the University’s Bias Report and Support System (BRSS) team. To report an instance of bias, visit www.brss.wustl.edu.

**WashU Cares:**
WashU Cares, within the Health and Wellness Unit, provides resources to all students on the
Danforth Campus who may be having a hard time. WashU Cares is committed to helping create a culture of caring. Through proactive, collaborative, and systemic approaches, they work with students to identify interventions, resources, and supports that allow them to be successful. If there is a concern about the physical or mental well-being of a student, please file a report on their website. See: https://washucares.wustl.edu/.

Center for Diversity and Inclusion (CDI)
The Center for Diversity and Inclusion (CDI) supports and advocates for undergraduate, graduate, and professional school students from underrepresented and/or marginalized populations, collaborates with campus and community partners, and promotes dialogue and social change to cultivate and foster a supportive campus climate for students of all backgrounds, cultures, and identities. See: https://diversityinclusion.wustl.edu/.
**Course Schedule:**
Please note that this schedule is a plan to help you stay organized during the semester, but it may be altered due to unforeseen circumstances, with appropriate advanced notification.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/15/20</td>
<td>Intro, Paper reading skills</td>
<td>Practice interpreting key parts of a scientific paper</td>
</tr>
<tr>
<td>9/22/20</td>
<td>Sequencing technologies and genomics pipelines</td>
<td>Student-led tutorials</td>
</tr>
<tr>
<td>9/29/20</td>
<td>Graphical abstracts</td>
<td>Paper discussion</td>
</tr>
<tr>
<td>10/6/20</td>
<td>NCBI</td>
<td>Workshop with mini-presentations</td>
</tr>
<tr>
<td>10/13/20</td>
<td>How to interpret a phylogeny</td>
<td>Paper discussion</td>
</tr>
<tr>
<td>10/20/20</td>
<td>Phylogenetics</td>
<td>Workshop with mini-presentations</td>
</tr>
<tr>
<td>10/27/20</td>
<td>What makes a good figure?</td>
<td>Paper discussion</td>
</tr>
<tr>
<td>11/3/20</td>
<td>Intro to R</td>
<td>No required class meeting. I will be on zoom during classtime to answer any questions.</td>
</tr>
<tr>
<td>11/10/20</td>
<td>ggplot</td>
<td>Workshop with mini-presentations</td>
</tr>
<tr>
<td>11/17/20</td>
<td>How to read a bioinformatics methods paper</td>
<td>Paper discussion</td>
</tr>
<tr>
<td>11/24/20</td>
<td>Intro to Galaxy</td>
<td>No required class meeting. I will be on zoom during classtime to answer any questions.</td>
</tr>
<tr>
<td>12/1/20</td>
<td>Excel tricks</td>
<td>Student-led tutorials</td>
</tr>
<tr>
<td>12/8/20</td>
<td>Genome re-sequencing and variant calling</td>
<td>Paper discussion</td>
</tr>
<tr>
<td>12/15/20</td>
<td>SNP analysis</td>
<td>Workshop with mini-presentations</td>
</tr>
</tbody>
</table>