Never Really Alone: Symbioses and Parasitism Around and Within Us.
Seminar in Scholarly Inquiry I 165

Mark O. Martin
Class Meetings: MWF 10-11, Thompson 188
Office Hours: M 3 - 4PM, Tu 1 - 2PM, W 8 - 9 AM
Thompson 257B (Office)
Thompson 275  (Lab)
(253) 879-2747
momartin@pugetsound.edu
But for my classes: DocMartinUPS@gmail.com

I. Scope and Purposes of this Course:

The poet and philosopher John Donne observed in 1624 that “no man is an island,” meaning that women and men do not exist in isolation, but as part of larger whole of humanity. This is true not only for interpersonal relations among human beings, but also between all living things on a more discrete and less philosophical level. In this course we will discuss and learn about these associations between what we can call the “large” and the “small,” ranging from bacteria living within aphids (and providing them with essential amino acids) to crustaceans that eat and replace the tongue of many species of fish. Yet at the same time there are many less obvious associations, often with more positive benefits, that will also be part of our discussion and learning environment. In every case, we will return to the idea of organisms “living together,” shaped to do so by evolution, regardless of the impact of that association, positive, negative, or indifferent.

Finally, there is disquieting evidence from various symbioses suggesting that some of these seemingly small organisms can in fact control the behavior of their larger “partners,” to promote their own “small agendas.” These can range from bacteria living within insects that attract or repel predators, to small worms that make insects seek out water (so that the parasite can complete its life cycle), to protists that make mice unafraid of cats. There is as of now little evidence that human beings dance like marionettes to the tunes of small puppeteers, but there are many, many examples in nature of such associations.

To make this course topic more personally relevant, beings like yourself (and yours truly) can in fact be seen as a “metaorganism,” composed of myriad living things working together. Some scientists have calculated that less than 10% of the cells that make up a human being are actually human cells; the vast majority are viruses, bacteria, and archaea, along with some larger entities (a few of which may seem a bit disquieting). Some of those “human associated”
organisms are vital for our well-being. Others cause disease. And many merely use us as a surface!

Humbling as that last sentence may sound, all of these “human associated organisms” have in fact co-evolved with us in remarkable ways, thus yielding the title of this course: we are never truly alone. From the bacteria in our gut that help us digest our food, to the strange mites that live for the most part harmlessly on our skin, to the parasites that cause tragic disease throughout human history, including today—-all of these “intimate strangers” have been with us throughout evolutionary time. They are a part of us, their very lives shaped and patterned to “fit” within an ecological niche that is composed of our bodies. We will return to this core concept again and again in this course.

All the above being said, ours is not only a course on symbioses and parasitism, nor is it strictly speaking a biology course. This is a first-year seminar course in scholarly inquiry using the fascinating topics above as focal points for the development of skills in discussion, writing, reading, and critical thought. In addition (and perhaps most relevant to each of you), this is a course designed to assist you to working within an academic community at a liberal arts institution. These skills, vital to success in academia (and outside the academic community), will be developed in several ways. You will use the texts, assigned readings, and social media elements as “raw material” to create a body of work in this course that will showcase the following academic skills from each of you:

- Ability to evaluate sources of information for accuracy, relevance, possible bias, and scope.
- Development of cogent, effective arguments related to a focused topic.
- Assessment and support of specific statements and claims.
- Development of self and peer review skills, as well as working within peer groups.
- Presentation of work to an academic audience verbally, in writing, and as part of a peer group.

II. Specific Course Objectives:

The Seminars in Scholarly Inquiry courses have a series of guidelines that we will follow. For the first semester courses, our objectives are intended to develop each student’s ability to:

- To read assigned texts, articles, blog posts, and editorials critically and with care.
- To take a position on a specific issue and support it effectively and clearly with evidence.
• To distinguish between different types of information sources (popular versus scholarly, primary versus secondary, review versus editorial).
• To use various attributed sources to build effective arguments.

Because of the nature of the topic that is at the center of this course, we can explore some additional course objectives:

• To compare and contrast how the public and scientists present research findings.
• To evaluate scientific arguments, particularly with regard to conclusions drawn.
• To learn how complex scientific arguments can be “repackaged” for other media outlets, including Twitter, blogs, podcasts, and editorials.
• To create several assignments, verbal and written, presented in an accurate and clear fashion.
• To work individually and as part of a peer group, so as to take deep ownership of one’s work and the work of peers.
• To gain an appreciation for the many different organisms that “make up” the totality that you see in the mirror every day...that you are never truly alone!

III. Course requirements:

Assignments in this course will be as follows:

A. Written assignments:

One of the key points of the SSI courses is the development and creation of clear, concise and well crafted writing projects. As such, there will be a fair amount of writing in this course, as described below. I will work hard to provide a detailed rubric with specific expectations in class, well ahead of deadlines, and to “space out” assignments. But do keep in mind that any of our SSI courses have a substantial workload. Work with me, and we will learn together.

My twin mottos for any of my classes are “clear expectations” and “no surprises.” This course will be no different.

Writing assignments to be turned in will follow typical University guidelines: appropriate headings and labels, 12 point font size, 1.5 line spacing, and appropriate margins. Please pay attention to due dates; they are quite firm without prior arrangement with me. Late assignments will lose 15% of points per day after the due date/time.

1. Reading responses: About once a week, each of you will be asked to reflect in writing on a particular reading assignment. In some cases,
you will be asked to focus on the main point (or three main points) of the reading. In other cases, you will be asked to summarize the assignment in one topic sentence. In still others, you will be asked to search the literature or the internet for related information. In all situations, the goal is to prepare you for classroom discussion, keep your mind nimble, and assist with future writing assignments. (general expectation of 1-2 pages total per assignment).

2. **Evaluation of sources**: several times during the semester, you will be provided with several sources related to a particular idea under class discussion. Your mission will be evaluate these sources for intended audience, accuracy, purpose, and classification (primary, secondary, popular, etc). (general expectation of 2-3 pages total).

3. **Library assignments**: there will be two formal “library assignments” in this class. One will take place at the beginning of the semester, and will guide your knowledge of how to use Library resources for our class. Later on, you will be asked to use Library resources in support of your other assignments. (general expectation of 2-3 pages total).

4. **Website evaluation**: I will direct students to a particular website that describes symbioses or parasitism. Your job will be to find two other websites on your own, and compare and contrast the intended audience, accuracy, level of academic professionalism, and so forth. (general expectation of 2-3 pages total).

5. **“My Favorite Symbiont”**: this will be one of the substantial assignments in this course, worth 22% of your grade. Each student will, with my assistance, select one type of symbiotic association, and delve deeply into it from a variety of perspectives. The assignment will be scaffolded so that the term paper will be built over the course of the semester, providing each student with a solid scholarly product. There will be peer review associated with this assignment. (general expectation of 10-12 pages total).

6. **Popular news analysis**: often, issues of scientific importance are portrayed in a fashion that has not quite as much to do with accuracy than we might hope. Students will be given a journal article, and three “news sources” that describe that work. The assignment will have each of you evaluate the news stories with regard to accuracy and completeness. (general expectation of 2-3 pages total).

7. **Podcast evaluation**: social media (Facebook, Instagram, Twitter, Tumblr, blogging, podcasts, etc) are more and more common in today’s burgeoning electronic world. Students will be directed to a podcast describing a symbiosis/parasitism topic, and asked to evaluate that podcast with regard to
audience, effectiveness, and accuracy. (general expectation of 2-3 pages total)

8. **Twitter assignment:** as above, social media is another conduit for the dissemination of scientific information currently. Students will use Twitter to explore how issues revolving around symbioses and parasitism are portrayed in that part of the internet. As always the important issues to be explored include intended audience, effectiveness, and accuracy. (general expectation of 2-3 pages total)

**B. Verbal/oral assignments:**

1. **Students will create,** in groups of three, a 15 minute PowerPoint presentation that will explore a specific example (to be selected in consultation with me) of symbioses or parasitism. This assignment will be presented to the class as a team effort. Evaluation will be both by me and your peers.

2. **Student discussion of PowerPoint presentations:** students will be peer evaluating the presentations, and participating in exploration of this topic.

**C. Creative assignment:** it is true that no two students learn in quite the same way. Historically, I have found that allowing students to “create” something of their own design assists with learning, and increases enthusiasm. Students will thus come up with a small “creative assignment” of their own design exploring some aspect of symbioses or parasitism. Possible approaches could be a blog post, poetry, a painting, or a musical performance.

**D. Overall participation:** as mentioned several times above, discussion and peer review are an important aspect of this course. I am happy to work with students on improving these vital skills.
IV. **Evaluation of your work:**

As with any course, the grade assigned is **earned** by your work ethic, attention to detail, and willingness to meet your instructor half-way. The following is a breakdown of the percentage of the grade earned by assignment:

<table>
<thead>
<tr>
<th>A. Written assignments:</th>
<th>total points</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reading responses (10 points per assignment)</td>
<td>120</td>
</tr>
<tr>
<td>• Evaluation of sources</td>
<td>20</td>
</tr>
<tr>
<td>• Library assignment</td>
<td>20</td>
</tr>
<tr>
<td>• Website evaluation</td>
<td>20</td>
</tr>
<tr>
<td>• “My Favorite Symbiont”</td>
<td>100</td>
</tr>
<tr>
<td>• Popular news analysis</td>
<td>20</td>
</tr>
<tr>
<td>• Podcast evaluation</td>
<td>10</td>
</tr>
<tr>
<td>• Twitter assignment</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Verbal/Oral Assignments</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Group presentation</td>
<td>40</td>
</tr>
<tr>
<td>• Discussion and participation during presentations</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C. Creative assignment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Overall participation (this includes attendance,</td>
<td></td>
</tr>
<tr>
<td>participation in discussions, peer review assignments)</td>
<td></td>
</tr>
</tbody>
</table>

Total number of points for YOU to earn: **450 points**

Grading will follow typical University standards:

Your total number of points at the end of the semester will be used to determine your average percentage (92%, 78%, etc.) which can be easily converted to a letter grade using the table below.

<table>
<thead>
<tr>
<th>Average Percentage</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>93-100</td>
<td>A</td>
</tr>
<tr>
<td>90-92</td>
<td>A-</td>
</tr>
<tr>
<td>87-89</td>
<td>B+</td>
</tr>
<tr>
<td>83-86</td>
<td>B</td>
</tr>
<tr>
<td>80-82</td>
<td>B-</td>
</tr>
<tr>
<td>77-79</td>
<td>C+</td>
</tr>
<tr>
<td>70-76</td>
<td>C</td>
</tr>
<tr>
<td>68-69</td>
<td>C-</td>
</tr>
<tr>
<td>66-67</td>
<td>D+</td>
</tr>
<tr>
<td>60-65</td>
<td>D</td>
</tr>
<tr>
<td>0 - 59</td>
<td>F</td>
</tr>
</tbody>
</table>

If you wish to calculate your grade at any point during the semester, simply divide your total points by the number of possible points at that time. Convert the decimal to a percent and look up your grade in the table above.
V. **Required course materials:**

A. Required texts (available in bookstore). These texts will be sources of background and formation necessary for classroom discussion, responses, and future assignments.


B. Reading assignments on Moodle.

Reading will be available at least one week before class discussion or assignments are due. In other words, you will have ample time to read and reflect on each writing assignment before it is due. I want to keep this open so that students can interact with me about current interests; I will then begin to “fine tune” assignments, to provide students with items reflecting those interests.

C. Web-based resources.

There are many fascinating website and podcasts to explore. Here are a few (and I will assign some of them as the semester progresses).

1. “Small Things Considered” is a primarily microbiology blog, sponsored by the American Society of Microbiology, but has wonderful essays describing symbioses, parasites, and diseases as well.


2. “Daily Parasite” is a fairly intense parasitology blog, but there is a great deal to explore here.

   [http://dailyparasite.blogspot.com/](http://dailyparasite.blogspot.com/)
3. “Parasite Wonders” is exactly as you might expect.

http://parasitewonders.blogspot.com/

4. “Phenomena” authored by Carl Zimmer (the author of one your required texts) is a very accomplished and serious science journalist. He does a meticulous job of explaining science. Many of his posts involve issues relating to symbioses and (of course) parasitism.

http://phenomena.nationalgeographic.com/blog/the-loom/

5. “Not Exactly Rocket Science” is authored by another superb science journalist, Ed Yong. Ed Yong has a particular interest in parasites that alter the behavior of their hosts (we will watch his fine TED talk on that topic).

http://phenomena.nationalgeographic.com/blog/not-exactly-rocket-science/

He also has a new website at “The Atlantic” with information worth reading:


6. “This Week in Parasitism” is an American Society for Microbiology sponsored podcast hosted by the great Vincent Racaniello. Dr, Racaniello sponsors a number of podcasts exploring issues relating the microbial world to everyday life; this is one of them. Much of the content is of medical importance, but a search through the archives will reveal a number of podcasts of interest!

http://www.microbeworld.org/podcasts/this-week-in-parasitism

7. “This Week in Microbiology” is an American Society for Microbiology sponsored podcast hosted by the great Vincent Racaniello. As before, not everything will relate directly to your (or this class' interest), but do scan through previous episodes.

http://www.microbeworld.org/podcasts/this-week-in-microbiology
If you have read thus far in the syllabus, please e-mail me (to my Gmail account, not my Puget Sound account) an image of a parasite, with the subject line “Symbionts Read Carefully.” You will receive 5 points extra credit if you do this before our next class meeting.

A few final words that are important for every student at the University of Puget Sound.

ACADEMIC HONESTY

You are expected to conduct yourself with integrity, as part of the academic community here at the University of Puget Sound. **ALL WRITTEN ASSIGNMENTS MUST BE WRITTEN INDIVIDUALLY AND ALL SOURCES OF INFORMATION MUST BE PROPERLY CITED.** If you plagiarize or cheat, or aid someone else in doing so, you violate a trust. No credit will be given for work copied or paraphrased from other sources (including another student) and harsher penalties may be applied (e.g. dismissal from the course with a failing grade, suspension, and/or expulsion from the University). Refer to the University of Puget Sound Logger for a definition and examples of plagiarism, as well as potential penalties for academic dishonesty:

http://www.pugetsound.edu/student-life/student-resources/student-handbook/academic-handbook/academic-integrity/

Every incident of academic dishonesty in this course **WILL** be reported to the Registrar. Academic dishonesty includes:

- plagiarism, copying, or misrepresenting yourself on written work
- misrepresenting data in lab reports
- using written notes during quizzes or exams (when notes are not permitted by the instructor)
- altering an exam or assignment after it has been returned
- defacing or unauthorized removal of library materials

Academic honesty is **serious** business. Please keep the above in mind.

Possible Disability Issues As They Relate to Academics:

Here is what the University of Puget Sound asks that I include in your syllabus regarding this topic:

“If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Peggy Perno, Director of Disability Services, 105 Howarth Hall, 253-879-3395. She will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.”
Please remember that these arrangements (as part of Disability Services and possible accommodations), are made ahead of time; no last minute arrangements can be made.

**Classroom Emergency Response Guidelines:**

*Please review university emergency preparedness, response procedures and a training video posted at [www.pugetsound.edu/emergency/](http://www.pugetsound.edu/emergency/). There is a link on the university home page. Familiarize yourself with hall exit doors and the designated gathering area for your class and laboratory buildings.*

*If building evacuation becomes necessary (e.g. earthquake), meet your instructor at the designated gathering area so she/he can account for your presence. Then wait for further instructions. Do not return to the building or classroom until advised by a university emergency response representative.*

*If confronted by an act of violence, be prepared to make quick decisions to protect your safety. Flee the area by running away from the source of danger if you can safely do so. If this is not possible, shelter in place by securing classroom or lab doors and windows, closing blinds, and turning off room lights. Lie on the floor out of sight and away from windows and doors. Place cell phones or pagers on vibrate so that you can receive messages quietly. Wait for further instructions.*