Biological Literature and Communication
The University of Toledo
College of Natural Sciences and Mathematics
Department of Biological Sciences
BIOL 4700-004 (Biol Lit and Comm-WAC)

Instructor: Tomer Avidor-Reiss, Ph.D.

Email: Tomer.AvidorReiss@utoledo.edu

Term: Fall 2016

Class location: BO 1099 or WH 1240

Class location: Monday and Wednesday 2:00-3:15pm

Credit Hours: Three Credits Hours

Website:
https://blackboard.utdl.edu/webapps/blackboard/execute/modulepage/view?course_id=_149994_1&cmp_tab_id=_322901_1&editMode=true&mode=cpview

Office Hours: Monday and Wednesday 3:15-5:15

Office location: Wolfe Hall Room 4259B

Office Phone: 419-530-1993

Catalog Description
A writing intensive course that focuses on reading original literature in biology in a variety of formats. Required of all biology majors.

Course Description
Welcome to *Biological Literature and Communication* and I hope you will find this enriching. This is a capstone course. It provides students the opportunity to demonstrate that they have achieved the learning goals of biology majors at the highest levels. The goal of this course is to give you the skills needed to evaluate scientific work and express a well-supported opinion in a concise manner. This course focuses on constructive and critical reading of original research papers, and aspires to mimic the various ways scientists discuss submitted scientific work and proposals. To accomplish this, you will read primary literature, discuss article content in class and in study groups, and formulate your own supported opinion about the results and interpretations put forth by the authors. You will present your opinion both in writing and verbally, and provide peer reviews for your classmates' work.

Be advised that this is an intensive Writing Across the Curriculum (WAC) course (see below for details) that includes writing, presenting, peer review, teamwork, and independent work. *Because WAC courses are intensive, I do not recommend taking more than one WAC course per semester.*

Student learning outcomes
Upon completion of this course, the student will be able to:

1) Understand and analyze primary scientific literature and use critical thinking to evaluate it.

2) Express thoughts scientifically, clearly, and in concise manner, both verbally and in writing.

3) Work collaboratively to present scientific literature.

4) Use and provide effective peer review for the presentation of scientific findings.

PREREQUISITES AND COREQUISITES
BIOL 3030 for level UG with minimum grade of C.

TEACHING STRATEGIES

This in an interactive course – both the instructor and students will lead discussions with the class. At the beginning of the course, the instructor provides general introduction. Students are required to search for additional literature and to read supplemental materials to ensure that they understand the background, methods used, etc.

To allow for in-depth understanding and critical reading, all of the papers discussed are related to a particular topic of clinical and scientific significance. Each paper is dissected carefully over several class periods.

A typical class involves:

1. Before each class, students will read a paper and write a report on the paper (see formatting instructions).
2. Before each class, a team of students will work together to understand the paper and then present the paper to the rest of the class.
3. Class may starts with a short clicker quiz composed of a few multiple choice questions intended to assess student preparation for class.
4. The class involves activities such as students presenting papers and class discussions of the paper.
5. At the end of each class, each student assesses his or her own participation in class.

COURSE EXPECTATIONS

Writing Assignment Format

Scientific writing should be simple, clear, and concise.

General text formatting

1. Each assignment must be on 1 page not more.
2. Use the font Arial, 11-12 pt;
3. Page margins are 0.5 inch with single line spacing.
4. Justify paragraphs
5. Do not indent at the beginning of a paragraph; instead, add a space of 3-6 points before a paragraph.
6. In case of assignment with multiple paragraphs, keep each paragraph on one page (do not have paragraphs separate over a page break). For that use MS Word: “Keep With Next” and “Keep Lines Together” functions (do not add empty lines to group paragraphs). The menu to a space before the paragraph and to keep paragraphs together is found in the Format menu: click Paragraph, and then click the Line and Page Breaks tab or Line and Page Breaks tab.
7. Make sure that a line of text does not have only a single word in it by “de-orphaning” the last word in a line using hard space (CTRL+ENTER in PC, or Shift+Option+ENTER in Mac).
8. In general, paragraphs should not be longer than 1/3 of a page.
9. *Grades will be reduced by 10% if any one of these formatting aspects is not followed precisely*.

Paragraph/summary highlights

A paragraph describing a scientific finding must have 7 elements. Please highlight each of the above elements with the following colors:

1. Background - What is **known** abut the subject (add references)? Make sure you address only most relevant information (Plain black no highlight)
2. Question - What is **unknown**? (Keep it general and distinct from the hypothesis) (Green)
3. Hypothesis - What is the author's hypothesis? What is the basis of the hypothesis? (Red)
4. Method – What were the method used in the most critical experiments and what is their purpose? (Blue)
5. Results - What did the authors find? (Plain black no highlight)
6. Conclusion - What is the author's interpretation? (Green)
7. Impact/future direction – What is the next longitudinal research step. (Red)
8. Reference list

General writing instruction

1. Background - add citation just near known fact (the citation words are not counted in 150 words)
2. Question - Keep it general and distinct from the hypothesis
3. Hypothesis - What is the basis of this hypothesis - add citation if new ideas are introduced. Use the word hypothesis, not "believe," "theory," "idea," or others.
4. Method – Focus on the key method that is used to test the hypothesis. Do not simply name the methods used, but rather conceptualize them and explain their purpose. This requires you to understand the method in general and how it is used in the paper. Use Wikipedia to learn the methods. (add references)
5. Results – describe the key observations that pertain to the hypothesis and method.
6. Conclusion – need to connect the result to the hypothesis.
7. Impact/future direction – Explain what you should be the next research step. Make sure it is longitudinal and not "me to science"

General: Do not use jargon. Keep it direct, active, with no excessive words like "it is known that …"

Uploading and copy in the class

Assignments can be uploaded more than once if there is a justified need. However, I will only grade the first assignment if no detailed explanation is provided as to why there was a need to submit an assignment more than once. A digital or hard copy of each assignment must be brought to class and the final assignment must be uploaded to blackboard. *Grades will be reduced by additional 50% if any these are not followed precisely.*

Syllabus assignment

The course syllabus provides you with the expectations for this course. The syllabus is subject to change during the semester to address specific issues that come up during the course. Make sure you bring the most recent copy of the syllabus to all classes.

Your first assignment in this class is to print, read, and bring a copy of the syllabus to the class and answer the following questions:

1) Have you read the syllabus?

2) Do you have any questions?

3) Please write the three things you think are the most important in the syllabus?

GRADING

Pre-class writing assignments:

The objective of the assignments is to train the student to read research paper critically and communicate the paper main findings and significance in a concise and clear way.

In the first few class grades will be given pass (example) or fail (0 – 50 out of 100) based on effort. In later classes once you have learn how to write the assignments they will be graded as described below.

Before the first discussion of each paper, you must submit assignments to Blackboard as a word document and bring the class a digital or hard copy. Do not forget to bring an extra hard copy to use in class to present your work. Because these preparations are critical for your participation in class, failing to submit the assignment before each class will result in a **50% grade reduction for the assignment**. Assignments are due at 8 AM on the day the paper will be first discussed in order for me to evaluate your level of understanding and adjust the class accordingly.

The 1st assignment for a paper – Paper Summery:

Read the new paper three times: first reading to filmier yourself with the paper in general. Second reading to find out the meaning of keywords that you do not know. Third reading to understand the content of the paper.

Upload a file with these four questions and your answer to them into Blackboard:

1. Paper reading experience
   a. When did you read the paper for the first time? How long it took you?
   b. When did you read the paper for the second time? How long it took you?
   c. When did you read the paper for the third time? How long it took you?
   d. All together, how was the reading experience? Provide examples from the reading experience. (10 points)
2. Write at least three terms used in the paper that you needed to research. Write their precise meaning, as you understand it from your Internet search. Explain how this meaning applies to the text you read and if it makes sense. (10 points).
3. Write 3 points of interest and explain why they interest you (be prepared to share them in class). (10 points)
4. Write in 150 words (indicate the number of words in the paragraph header) of a clear, concise, and cohesive paragraph about the paper including the seven sections: Background, Question, Hypothesis, Method, Results, Conclusion, and Impact (address them in this order). Each, of the section equals 10 points.

The 2nd assignment for a paper - Figure Summery:

Reread the paper to increase the depth of your understanding of the paper, and then upload a file with your answers to the following four questions into Blackboard:

A) When did you read the paper for the again? How long it took you? How was the new reading experience reading? (10 points)

B) Write at least 3 new terms used in the paper that you needed to research, than write their precise meaning (as you understand it from your Internet search), and finally, explain how this meaning. (10 points)

C) Identify the most significant figure and explain shortly why it is the most significant. (10 points)

D) Please describe the most significant figure of the paper using 150 words (please indicate the number of words in the paragraph header) and Background, **Question**, Hypothesis, Method, Results, **Conclusion**, Impact (address them in this order). Highlight each of the sections with the distinct formats specified previously. In this paragraph, you evaluate other people work that was done in the past; therefore use correct grammar accordingly. Each, of the section equals 10 points to a total of 70 points.

The 3rd assignment for a paper – Research Plan:

Reread the paper to increase the depth of your understanding of the paper, and then reread the section of the paper that is going to be discussed in the class

1. When did you read the paper for the again? How long it took you? How was the new reading experience reading? (10 points)
2. Write 150 words (please indicate the number of words in the paragraph header) research proposal to extend the paper's finding to the next level. Make sure to use all general text formatting instructions found in the syllabus including: Background, Question, Hypothesis, Method, Results, Conclusion, and Impact. In this paragraph, you propose your work that will be done in the future; therefore use correct grammar accordingly. The proposed research must be a longitudinal and direct extension of the Paper research. Propose a simple, specific, and plausible hypothesis and experiment (address them in this order). Each, of the section equals 10 points to a total of 70 points. 20 additional points are for research plan that is longitudinal.

The 4th assignment for a class when other present and you do not (past/fail) – Questions List:

1. When did you read the paper? How long it took you? How was the new reading experience reading? (10 points)
2. Write clearly a meaningful question to each panel that will be presented.

Video checklist Assignment - assignment 5

1. *Watch the video of Susan McConnell* (Stanford) titled: *Designing effective scientific presentations*, which is found at: http://www.youtube.com/watch?v=Hp7Id3Yb9XQ.
2. Make a checklist of all the points made in the video to use as a guide when preparing your presentation. The checklist needs to be divided to subgroups. Each point needs to be explained clearly with rezoning.
3. Upload the checklist with your examples and presentation to Blackboard.

Assignment for a class when you present - Video checklist - assignment 6

1) See the *Susan McConnell* video again and confirm your checklist is complete.
2) Near each point in the checklist give an example from your presentation or explain why you didn't apply it.
3) Upload the checklist with your examples and presentation to Blackboard.

Mid-term exams/paper

The midterm exam/paper represents the work of the student, and help from others is not permitted at any stage of its preparation. The midterm exam is an open book exam, and you can bring with you any information you feel is appropriate to help you with this assignment. The midterm paper will be identical to the 1st paragraph that is 140-150 words long (please indicate the number of words in the paragraph). The paper for this exam will be announced during the exam. The midterm exam/paper like all other assignments in the course must be typed and saved on the blackboard as a word document.

Final Term Paper – Research paper:

The final term paper represents the work of the student, and help from others is not permitted. The term paper will mimic the general text format of the preclass assignments. The paper for this year will be announced during the class.

Your first aim should be to get a copy of the paper's main text and supplementary data by searching the Internet via PubMed.

Then, in the term paper, using 450 words (not more), address the points below:

1) Paper Summery: A short introduction (a 150 words long- please indicate the number of words in the paragraph) summarizing the paper addressing Background/ **Question**/ Hypothesis/ Method/ Results/ **Conclusion**/ Future direction.

2a) Identify the most significant figure and explain shortly why it is the most significant.

2b) Figure Summery: Summarize the single most critical figure of the paper (140-150 words long- please indicate the number of words in the paragraph). Summarize the important Figure by addressing the: Background/ **Question**/ Hypothesis/ Method/ Results/ **Conclusion**/ Future direction.

3) Research Plan: A discussion (150 words long - please indicate the number of words in the paragraph) addressing the future research that derived directly from this paper.

Writing assignments must be submitted on Blackboard as a word document. Papers handed in late will receive a penalty of 10% per day late. Papers with each section longer than 150 words will receive an additional penalty of at least 10% per section.

Team Work:

At the end of the first class, students will be grouped into teams of 3 to 6 students that will review papers together, divide the paper presentation, and peer review each other's work in a 1 hour weekly meeting, outside of class. Each team has a team leader that will coordinate the team activities. Students interested in being a team leader should contact the instructor ASAP. Each student will assess themselves separately for participation in the one-hour weekly team and peer review.

Rubric for Participation in the one-hour weekly team meeting: at the end of each meeting, each student will assess himself or herself. Making 5 constructive comments for a full grade (100), 4 constructive comments for a grade of 90, 3 constructive comments or less for a grade of 80, 70, and 60 respectively. If you were not present, give yourself a grade of 0. Each student will upload the following information (failing to fill all information will lead to a 0 grade):

Name:	My 1st constructive comments:
My grad:	My 2nd constructive comments:
Meeting date:	My 3rd constructive comments:
Meeting time:	My 4th constructive comments:
Location:	My 5th constructive comments:

Extra credit assignments

Each time you will do it properly, you will get 1% increase of your total grade up to 3% if you do it to 3 times. Attend a departmental guest lecture and write a 150-word summary. You can be helped the presenter papers. Use all general text formatting instructions found in the syllabus including: Background, Question, Hypothesis, Method, Results, Conclusion, and Impact.

Clicker questions:

Depending on how class progress we may add this activity. Class may starts with several questions intended to verify that the student read, remembered, and understood the paper. This can be: explaining a critical word in the paper, explaining a key concept in the paper, explaining a method used, explaining a paper's figure, or explaining how the paper reached its conclusion. For papers discussed over several meetings, the questions require a higher level of understanding in the later meetings.

Final Grading

Students who do not attend class regularly, stop attending at some point throughout the semester, or missed more then 4 classes will be given a final grade of "F" which will impact your overall grade point average (GPA). Since this course is required for biology majors having "F" will deny you from receiving BS. To formally withdraw from this or any other course you need to contact the Registrar's Office.

Student can be apple any grades up to 7 days after their deposition (this apply to both grades obtain during and at the end of the course) – later apples will not be considered.

The grading scale for this course is as follows:

A	100-88%	A-	87-85%	B+	84-82%	B	81-80%	B-	79-77%
C+	76-74%	C	73-70%	C-	69-67%	D+	66-64%	D	63-60%
D-	59-56%	F	55-0%.						

Grades will be determined based on six factors with an approximate weight as follows (The instructor may change these weights at any time during the course to ensure the students achieve the course goals):

Pre class assignments:	20%	Team work:	2.5%
Clicker questions:	Up to 20%	Midterm exams/paper (optional)	10%
Presentations + Presentation test	20-30%	Peer Reviews:	2.5%
Term exam/paper:	20-30%	Total:	100%
Class participation:	5%		

Oral presentation of the paper figures:

Each class meeting, students from one team, will make an oral presentation to the class; students should expect to present multiple times during the course. A student will present one of the paper's figures panel as if he or she was one of the paper's authors. The goal of the presentation is to explain the panel. Presentations will consist of a multi-slide PowerPoint presentation that includes: Titles, Figure panel's parts, and the notes (in the notes section, not on the slide itself) with what the presenter is planning to say. At the end of each student's presentation, the present will call for questions and there will be a discussion, as is usually the case when scientists present their work in a meeting. The student presenting the figure will answer questions and defend the work as if he or she was the author. The presentation must be saved on the blackboard as a PPTX document. Make sure the "page setup" in the PPTX document is 10inches wide and 7.5 inches height.

Each student's presentation should take 5 minutes or less. An excellent presentation is one that spends about one minute on each conceptual point presented in 1 slide (usually each panel in a figure is one slide). Presentations should be short, concise, and to the point.

Following up the presentation of each student, the instructors and students will provide feedback on the presentation with constructive suggestions for improvement in class. Rubric:

Weight/ Grade	100%	75%	50%	25% or 0%
	Clear, concise, supported, and explained significance	Can be improved	Requires substantial improvement	Deficient or Missing
70%	Then for each panel in the presentation describe 1) Known - What is known about the subject? **2) Question** - What is not known that led to this experiment? **3)** Hypothesis - What is the author's hypothesis? **4)** Method – What was the experimental method? What are the advantages and limitations of the method? **5) Results** - What did the authors find? **6) Conclusion** - What is the author's interpretation? Do you agree with it? 7) Impact/Value to the figure/paper story line			
General				
10%	Slide Titles	Described concisely the take home message	Vague, too long, or not to the point	Does not include the slide premise	Missing
10%	Cohesiveness of presentation	There is clear connection in the transition between slides	The transition between slides can be improved	The transition between slides needs major improvements	Missing
5%	Presentation mechanics	Students faced the audience and pointed to all slide elements at the appropriate time.	Students inconsistently faced the audience or failed to point to the slide elements.	Students rarely faced the audience or failed to point to the slide elements.	Students did not face the audience or failed to point to the slide elements.
5%	Questions and answer section	Question content is repeated and the answer is to the point	Inconsistent question repeating or answer is unfocused	Failing to repeat the question and providing an answer that needs major improvements	Failing to repeat question and providing an irrelevant or wrong answer

Attendance

Since this course is based on demonstrating comprehension of the materials presented, students are required to attend every class. Unexcused absences will not be tolerated, and excused absences should be rare and supported by a physician's note or other piece of documentation. **Students that miss 4 or more classes will automatically fail the class.**

Student must attend or perform the activities in all the first 6 classes, as they are critical to attaining the course goals. Students that are missing any of these classes will need to submit to the instructor all class activities within 1 week of their enrolling in the course or returning to class after being absent. Students failing to follow these instructions precisely will lose at least a full letter grade from their final semester grade in the course.

Class participation
Students must actively participate in class discussions and demonstrate that they have read the assigned paper, analyzed the paper critically, and have done the extra background analysis needed to comprehend the material. Prior to coming to class, students are required to research all aspects of the paper until they understand it completely and are ready to discuss it with their classmates. Rubric:

Full grade (100) - student made 2 or more meaningful contributions to the discussion.

80 - student made 1 contribution to the discussion.

50 - student that listened attentively to the discussion.

0 - Absence from class or not listening to the discussion.

At the end of each class, each student will submit a paper describing the contributions he or she made to the class discussion that contains the following information:

Name: Date: Grade:

One sentence description of the most meaningful contribution you made:

One sentence description of the second most meaningful contribution you made:

One sentence description of evidence that you have listened attentively to the discussion:

COMMUNICATION GUIDELINES
As your instructor, I am here to help, and will do my best to respond to mail within 24 to 48 hours. Students are expected to check the course's blackboard site frequently for important course information. In addition, if you are having difficulty in the course or trouble understanding any aspect of it, please let me know.

STUDENT SUPPORT SERVICES
The University of Toledo offers a wide range of academic and student support services that can help you succeed:

The Writing Center - Provides free, face-to-face, and online tutoring for writers. The staff there can assist you with your weekly writing assignments (but not in your mid or final term assignments which are an exam).

Tutoring Services Tutoring - Available through the Learning Enhancement Center located in the Carlson Library. Tutoring Services are offered in an array of subjects, including Writing and Biology.

The Counseling Center - In need of crisis intervention or mental health services please contact the Center.

Success Coach – help students navigate their college experience by serving as a single point of contact.

REQUIRED TEXTS AND ANCILLARY MATERIALS

The Science of Scientific Writing. This article can be downloaded from http://engineering.missouri.edu/civil/files/science-of-writing.pdf. Originally it appeared in American Scientist, journal of Sigma Xi.

ISBN-13: 978-0205747467 Style: Lessons in Clarity and Grace (10th Edition) by Gregory G. Colomb and Gregory G. Colomb. This book explains how to write clearly, simply and concisely.

doi:10.1016/j.molcel.2009.10.007 How to give a good talk. Uri Alon 2009 Oct 23;36(2):165-7. This article can be downloaded from http://www.sciencedirect.com/science/article/pii/S1097276509007424

ISBN 13: 9780879697358 Experimental Design for Biologists by David J. Glass

Publication date: Nov 28, 2006 | ISBN-10: 0879697350 | ISBN-13: 978-0879697358 | Edition: 1.

*Papers that will be used in the course (*You will use PubMed to get the papers and supplemental data)

In the beginning of the course, the Instructor will present:

1) Centrioles, Centrosomes, and Cilia in Health and Disease *doi:10.1016/j.cell.2009.10.036*

2) Functional genomic analysis of cell division in *C. elegans* using RNAi of genes on chromosome III By Gönczy P et. al Nature. 2000 Nov 16;408(6810):331-6.

Next, the student will present these papers (in this order):

3) SAS-4 is a C. elegans centriolar protein that controls centrosome size By Kirkham M et al. Cell. 2003 Feb 21;112(4):575-87 (7 figures)

4) A centrosomal mechanism involving CDK5RAP2 and CENPJ controls brain size By Bond J, Nat Genet. 2005 Apr;37(4):353-5. (2 figures)

5) Asymmetric centrosome inheritance maintains neural progenitors in the neocortex. Nature 461, 947-955 (2009) (5 figures)

6) EMBO J. 2016 Feb 29. pii: e201593679. [Epub ahead of print]. CPAP promotes timely cilium disassembly to maintain neural progenitor pool.

TECHNOLOGY REQUIREMENTS

Clickers may be required and may need to be registered with blackboard.

Personal iPad or laptop computer are strongly recommended for each student in class.

Homework and instruction require Microsoft word and power point.

All assignment and course material are provided via Blackboard. It is your responsibility to routinely read the Blackboard postings (e.g. announcements and assignments).

UNIVERSITY POLICIES

The University is an equal opportunity educational institution.

The University of Toledo is committed to providing equal access to education for all students. If you have a documented disability or you believe you have a disability and would like information regarding academic accommodations/adjustments in this course please contact the Student Disability Services Office.

ACADEMIC POLICIES

As a student in my course and enrolled at The University of Toledo you should be familiar with the policies that govern the institutions academic processes including: Academic Dishonesty, Enrollment, Status, and Grades. Please read Undergraduate Academic Policies.

COURSE SCHEDULE: (This schedule is subject to change depending on progress in class)

Part 1 – introduction

1. Introduction, team assignment, and Research university - WH 1240
2. Syllabus and how scientists communicate – Papers searching (PubMed) - BO 1099
3. Scientific Writing - WH 1240
4. Go over the video to confirm complete cheek list (See the video before class make checklist) (upload a final checklist as post class activity)
5. Review (**1**): Centrioles, Centrosomes, and Cilia in Health and Disease
6. Exam on centriole biology and introduction to the 7 Points.

Part 4 – Research paper presentations - Wolfe Hall 1240

Paper: (**2):** Functional genomic analysis of cell division in *C. elegans* using RNAi

7. Part 1 - paper introduction – writing: known, unknown and hypothesis (Read title, abstract and introduction - do Paper summery pass/fail – Only known, unknown and hypothesis)
8. Part 2 - Paper summery discussion continue (Full assignment 1 - Paper summery pass/fail), explaining method used.
9. Part 3 - Fig summery discussion (Fig summery pass/fail).
10. Part 4 - Tomer present Table 1 panel A – (Paper summery graded)
11. Part 5 - Student present Fig 2 - (Student prepare presentation of Fig 2)

Paper: (**3)** SAS-4 is a C. elegans centriolar protein that controls centrosome size

12. Part 1 - Introduction - The 150 word paper summery (Paper summery pass/fail)
13. Part 2 - Paper summery discussion (Paper summery pass/fail)
14. Part 3 - Fig summery discussion (Fig summery pass/fail)
15. Part 4 - Student present fig 1 panels A, B, C, D, E, F – (Paper summery graded)
16. Part 5 - Student present fig 2 panels A, B, C, D, E, F – (Fig summery graded)

Paper: (Mid term**)**

17. Mid term exam - BO 1099
18. Mid term exam discussion

Paper: (**4)** A centrosomal mechanism involving CDK5RAP2 and CENPJ controls brain

19. Part 1 - Paper summery discussion (Paper summery graded)
20. Part 2 - Fig summery discussion (Fig summery graded)
21. Part 3 - Student present fig 1 and 2 A-C – (Fig summery graded)
22. Part 4 - Future direction discussion - (Future direction summery pass/fail)

Paper: (**5**) Asymmetric centrosome inheritance maintains neural progenitors … (Group 1; 5 figures)

23. Part 1 - Paper summery discussion (Paper summery graded) – give term paper
24. Part 2 - Fig summery discussion (Fig summery graded)
25. Part 3 - Student present fig 1 A, B, C, & D + fig 2 A, B, C, D, E, F (Future direction summery
26. Future direction discussion - (Future direction summery graded) – deadline for term paper

Part 5 – Term paper presentations - Wolfe Hall 1240

Paper: (**6**) Asymmetric Inheritance of Centrosome-Associated Primary Cilium Membrane Directs Ciliogenesis after Cell Division

27. Part 1 - Student present fig 1 panels A, B, C, D, E, F + 2 panels A, B, C, D, E, F, G, H, I
28. Part 2 - Presentation test - fig 3 panels A, B, C, D, E, F & fig 4 panels A, B, C, D, E, F

Part 6 – Field test - Wolfe Hall 1240

29. Part 1 - Student present fig 1 panels A, B, C, D, E, F & 2 panels A, B, C, D, E, F, G, H, I
30. Part 2 - Presentation test - fig 3 panels A, B, C, D, E, F & fig 4 panels A, B, C, D, E, F