Biology 181
Freshman Seminar in Biology

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A lecture course intended for first-year students contemplating a major in biology. Each week active researchers describe the biological context of their research, the specific questions they have formulated, the means by which they pursue the answers, and their data and conclusions. Students are expected to attend all lectures. Students will write two short papers; each paper will be based upon a Biology 181 lecture and its associated readings. Must be taken Credit/No Credit. Medium-sized class. Credit 1 unit. Fall Semester, Tuesdays, 3:30PM-5:00PM, Rebstock 322.

- Biology 181 Fall 2016 Schedule
- Biology 181 Fall 2016 Syllabus
- Citation Guide for Biology 181 Short Papers
Biology 181: FRESHMAN SEMINAR IN BIOLOGY Fall 2016

Coursemaster: Paul Stein <stein@wustl.edu> (Phone: 935-6824; Office: Monsanto 212)
Teaching Assistant: Abhinav Srinath <abhinav.srinath@wustl.edu>

Biology 181 is designed to present a realistic picture of how science is done. An additional objective is to acquaint prospective Biology majors with fields of study in biology and with the research of faculty in Biology and related departments. If you have any questions concerning Biology 181, please talk with either Paul Stein or Abhinav Srinath before or after class or make an appointment.

DESCRIPTION: The course consists of a series of 13 class meetings. 12 meetings will be research lectures given by different faculty members on topics of the professor's interest. 1 meeting will include lectures by Biology 500 students on their undergraduate research. Class meetings will be on Tuesdays from 3:30pm-5:00pm in Room 322 in Rebstock Hall.

See the course website http://www.nslc.wustl.edu/courses/Bio181/bio181.html for the up-to-date lecture schedule, the PDFs for readings, and the background information for each speaker. Enter user name: bio181 and password provided in class to access PDFs. Credit for the course is 1 unit PASS/FAIL only. No letter grades will be issued. This does not interfere with your ability to take another Cr/NCr course.

REQUIREMENTS:

1. CLASS MEETINGS: Students are required to attend at least 9 of the class meetings (see web page for schedule) in order to pass the course. You are expected to take notes at each faculty research lecture to assist you in the preparation of your short papers and to gain skill in note-taking during science lectures. Please print your name and sign your name on a sheet that we will have in the back of the lecture room each week to indicate you attended. It is a serious breach of the honor code for a person to sign in for an absent student. You must be present during the entire duration of the class meeting in order to receive credit for attendance at that meeting. On selected random Tuesdays, students must sign a 2nd signup sheet at 5PM at the end of class to verify their attendance during the entire class.

Regularly scheduled seminars in the Biology Department may be substituted for lectures in Bio 181 for the CLASS MEETING requirement. To receive CLASS MEETING credit for the substitution, you must attend the entire duration of the seminar and submit a 1-page double-spaced written summary of the main points of the seminar speaker's talk. See the seminar webpage http://wubio.wustl.edu/events for a current schedule. If you elect to use this substitution, your written summary does not count as a required short paper described in the next section. You may receive credit for a maximum of 2 substitutions during the semester. The deadline for receipt of the written summary is 3:30pm on December 6, 2016.

2. READINGS AND TWO SHORT PAPERS: PDFs of articles are posted on the course website for each faculty research lecture to enable you to pursue topics further. You are required to choose 2 of the research topics presented by faculty speakers in Bio 181 lectures and read the PDFs posted for these lectures. You will need to write 2 short papers that each receive a mark of "+++" or "++" in order to pass the course. Short papers that receive a mark of "+" will need to be re-written; Abhinav Srinath will provide suggestions for improvement. Each short paper will be at least 2 pages long and will include:

   (1) a short summary of the main points of the speaker's talk;
   (2) a description of the main points of at least two of the PDF articles associated with the talk;
   (3) suggestions for future experiments in the field.

Double space your paper and include a reference list. Include your name, the date, and the page number on the header for each page. When you state a claim in your paper based upon an outside source, be sure to reference that source within the text of your paper and to include the specifics of that reference in your reference list. Use the style described in the file titled "2016 Citation Guidelines for Bio 181 Papers" that can be downloaded from the Bio 181 home page. Use headings for the major sections of your paper:

Lecture Overview, Article Summaries, Suggestions for Experiments. Use subheadings for major ideas within each of the sections of the paper. Hand in your papers to the course teaching assistant, Abhinav Srinath. Direct your questions, comments, or concerns with respect to the papers to Abhinav Srinath. The first short paper is due in class by 3:30pm on September 27, 2016; the second short paper is due in class by 3:30pm on November 8, 2016. You may select any Bio 181 faculty speaker for your second short paper except for the Bio 181 faculty speaker whose talk was summarized in your first short paper. The deadline for receipt in class of re-written short papers is 3:30pm on November 29, 2016.

A SPECIAL REQUEST: Biology 181 is an optional course. We offer it because we know that some first-year students are very interested in research. In order to allow the student to test that interest, we ask world-class research scientists to spend time with you to give you the flavor of biological research. Each year, sometime into the course, some students decide the lectures are not very interesting to them. Fair enough. One of the objectives of the course is to allow students to test the water. If you find that the lectures do not hold your interest, please withdraw from the course. The course is only 1 unit of credit and is meant to be exciting and a pleasure, not punishment. For reasons beyond our understanding, in the past, students who have lost interest continue to attend class, are inattentive, and even rude. This makes for a very unpleasant situation for all concerned. Feel free to withdraw from the class if you lose interest in the material. If you attend the class, please be attentive and, of course, polite.
**Biology 181 Fall Semester 2016 Schedule**

**Freshman Seminar in Biology**

- Bio 181 classes meet in Rebstock 322 on Tuesdays 3:30pm - 5:00pm
- Coursemaster: Paul Stein, Biology Department, EMail: stein@wustl.edu, Phone: (314) 935-6824
- Teaching Assistant: Abhinav Srinath, Email: abhinav.srinath@wustl.edu
- Last day to drop course without W is Thursday, September 8, 2016.
- Last day to withdraw from course with W is Friday, November 18, 2016.
- Paper #1 is due on September 27, 2016; Paper #2 is due on November 8, 2016.

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<tr>
<th>Week #</th>
<th>Date</th>
<th>Researcher</th>
<th>Topics and Readings</th>
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| 1      | 30-Aug-16 | Erik Herzog      | Unwinding the Biological Clock  
1. Vasoactive intestinal polypeptide mediates circadian rhythmicity and synchrony in mammalian clock neurons  
2. Neurons and networks in daily rhythms |
| 2      | 6-Sep-16  | Doug Chalker     | Science's Next Top Model: The Organisms of Discovery  
1. Model Organisms  
2. RNA Interference: Big Applause for Silencing in Stockholm  
3. Model organisms — A historical perspective  
4. The slides of Dr. Chalker's talk These are to assist you in writing a short paper based upon Dr. Chalker's talk. They do NOT count as one of the PDFs that you will summarize for your paper if you select Dr. Chalker's talk for one of your papers. |
| 3      | 13-Sep-16 | Jeff Gordon      | The Human Gut Microbiota and Healthy Growth: A Microbial Perspective about Human Development  
1. Harrison's Principles of Internal Medicine  
2. Honor Thy Gut Symbionts Redux  
3. Human nutrition, the gut microbiome and the immune system  
4. Childhood undernutrition, the gut microbiota, and microbiota-directed therapy |
| 4      | 20-Sep-16 | Sarah England    | Electrical Activity of the Womb: Pores and Pregnancy  
1. BKCa channel regulates calcium oscillations induced by alpha-2-macroglobulin in human myometrial smooth muscle cells  
2. Physiological pathways and molecular mechanisms regulating uterine contractility  
3. Why the heart is like an orchestra and the uterus is like a soccer crowd |
| 5      | 27-Sep-16 | Scott Mangan     | Buried, But Not Dead: Soil-Borne Organisms Determine Plant Community Composition  
1. Negative plant–soil feedback predicts tree-species relative abundance in a tropical forest  
2. Grassroots Ecology: Plant-Microbe-Soil Interactions as Drivers of Plant Community Structure and Dynamics |
| 6      | 4-Oct-16  | Gammon Earhart   | From Turtles to Turning to Tango: Studies on the Neural Control of Movement  
1. Randomized Controlled Trial of Community-Based Dancing to Modify Disease Progression in Parkinson Disease  
2. Effect of subthalamic deep brain stimulation on turning kinematics and related saccadic eye movements in Parkinson disease  
3. Gait-Related Brain Activity in People with Parkinson Disease with Freezing of Gait |
| 7      | 11-Oct-16 | Joe Corbo        | The Role of Transcriptional Regulatory Networks in Organismal Development  
1. Vertebrate Neural Cell-Fate Determination: Lessons from the Retina  
2. Transcriptional regulation of photoreceptor development and homeostasis in the mammalian retina  
3. Reprogramming of adult rod photoreceptors prevents retinal degeneration |
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<th>Date</th>
<th>Time</th>
<th>Speaker</th>
<th>Topic</th>
<th>Subtopics</th>
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<tr>
<td>18-Oct-16</td>
<td>8</td>
<td>Nathan Stitziel</td>
<td>Lessons from the Human Genome: From Biology to Therapy</td>
<td>1. Initial impact of the sequencing of the human genome</td>
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<td>2. Clan Genomics and the Complex Architecture of Human Disease</td>
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<td>3. Leveraging human genetics to guide drug target discovery</td>
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<td>25-Oct-16</td>
<td>9</td>
<td>Jonathan Myers</td>
<td>Causes and Consequences of Biodiversity in Our Changing World</td>
<td>1. Matters of Scale</td>
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<td>2. Biodiversity loss and its impact on humanity</td>
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<td>3. Beta-diversity in temperate and tropical forests reflects dissimilar mechanisms of community assembly</td>
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<td>1-Nov-16</td>
<td>10</td>
<td>Kendall Blumer</td>
<td>How Does the Retina Work?</td>
<td>1. The need for speed</td>
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<td>2. Defects in RGS9 or its anchor protein R9AP in patients with slow photoreceptor deactivation</td>
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<td>8-Nov-16</td>
<td>11</td>
<td>Bob Blankenship</td>
<td>Photosynthesis</td>
<td>1. On the Origin of Photosynthesis</td>
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<td>2. Defossiling Fuel: How Synthetic Biology Can Transform Biofuel Production</td>
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<td>3. Redesigning photosynthesis to sustainably meet global food and bioenergy demand</td>
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<td>15-Nov-16</td>
<td>12</td>
<td>Ken Olsen</td>
<td>Biology 500 and Presentations by Undergraduate Researchers</td>
<td>1. Dr. Olsen's slides</td>
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<td>2. Biology 200/500 Independent Study</td>
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<td>3. Biology Department</td>
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<td>4. Undergraduate Studies</td>
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<td>5. Students interested in research</td>
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<td>6. Washington University Summer Undergraduate Research Fellowships (SURF)</td>
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<td>7. Research/Job Opportunities</td>
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<td>8. Strategy for finding a mentor</td>
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<td>9. Help finding a summer job</td>
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<td>10. List of potential mentors</td>
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<td>11. Clinical Research Funder Studies at WUSM</td>
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<td>12. NIH</td>
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<td>Biology 500 and Presentations by Undergraduate Researchers</td>
<td><strong>Presentations by Biology 500 students</strong></td>
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<td>Trevor Krolak and Saryu Sanghani</td>
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<td>22-Nov-16</td>
<td>13</td>
<td>Petra Anne Levin</td>
<td>From Frogs to Bacteria: How to Succeed in Research by Really Really Trying</td>
<td>1. The Division Inhibitor EzrA Contains a Seven-Residue Patch Required for Maintaining the Dynamic Nature of the Medial FtsZ Ring</td>
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<td>2. The great divide: coordinating cell cycle events during bacterial growth and division</td>
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2016 Citation Guidelines for Bio 181 Papers
Written by Becca Tsevat in Fall 2011 and modified by Paul Stein for the Fall 2016 class.
Becca was the Bio 181 Teaching Assistant in Fall 2011.
She graduated in May 2012 from WashU with a Double Major in English Literature and Biology.

Although each scientific journal has its own citation style, Bio 181 students will use APA style for the papers in the Bio 181 class. Below is a list of guidelines and examples for the types of sources you will most likely be referencing; however, if you are citing a source that is not discussed below, feel free to EMail the 2016 Bio 181 Teaching Assistant, Abhinav Srinath <abhinav.srinath@wustl.edu>, with questions or visit the links referenced below.

For In-Text Citations:

Short Quotations
If you are directly quoting from a work, you will need to include the author, year of publication, and the page number for the reference (preceded by "p."). Introduce the quotation with a signal phrase that includes the author's last name followed by the date of publication in parentheses. Be sure to include the full reference in your Bibliography at the end of your paper.

According to Jones (1998), "Students often had difficulty using APA style, especially when it was their first time" (p. 199). Jones (1998) found "students often had difficulty using APA style" (p. 199); what implications does this have for teachers?

If the author is not named in a signal phrase, place the author's last name, the year of publication, and the page number in parentheses after the quotation.

She stated, "Students often had difficulty using APA style" (Jones, 1998, p. 199), but she did not offer an explanation as to why.

Long Quotations
Place direct quotations longer than 40 words in a free-standing block of typewritten lines, and omit quotation marks. Start the quotation on a new line, indented 1/2 inch from the left margin, i.e., in the same place you would begin a new paragraph. Type the entire quotation on the new margin, and indent the first line of any subsequent paragraph within the quotation 1/2 inch from the new margin. Maintain double-spacing throughout. The parenthetical citation should come after the closing punctuation mark.

Jones's (1998) study found the following: Students often had difficulty using APA style, especially when it was their first time citing sources. This difficulty could be attributed to the fact that many students failed to purchase a style manual or to ask their teacher for help. (p. 199)
Summary or Paraphrase
If you are paraphrasing an idea from another work, you need to make reference to the author and year of publication in your in-text reference. APA guidelines also encourage you to provide the page number (although it is not required).

According to Jones (1998), APA style is a difficult citation format for first-time learners. APA style is a difficult citation format for first-time learners (Jones, 1998, p. 199).

For the Reference List:
- When you state a claim in your paper based upon an outside source, be sure to reference that source within the text of your paper and to include the specifics of that reference in your reference list.
- All lines after the first line of each entry in your reference list should be indented one-half inch from the left margin. This is called hanging indentation.
- Authors' names are inverted (last name first); give the last name and initials for all authors of a particular work for up to and including seven authors. If the work has more than seven authors, list the first six authors and then use ellipses (=". . ") after the sixth author's name. After the ellipses, list the last author's name of the work.
- Alphabetize reference list entries by the last name of the first author of each work.
- If you have more than one article by the same author, single-author references or multiple-author references with the exact same authors in the exact same order are listed in order by the year of publication, starting with the earliest.
- Capitalize all major words in journal titles.
- When referring to books, chapters, articles, or Web pages, capitalize only the first letter of the first word of a title and subtitle, the first word after a colon or a dash in the title, and proper nouns. Do not capitalize the first letter of the second word in a hyphenated compound word.
- Italicize titles of longer works such as books and journals.
- Do not italicize, underline, or put quotes around the titles of shorter works such as journal articles or essays in edited collections.

Article from an online journal

Example:
Lecture or Speech
Speaker, A.A. “Title of Speech.” Sponsoring organization, Name of Conference. Location.
Date.

Example:

One Author
Last name first, followed by author initials.


Two Authors
List by their last names and initials. Use the ampersand instead of "and."


Three to Seven Authors
List by last names and initials; commas separate author names, while the last author name is preceded by ampersand.


More than Seven Authors

Sources:
http://ia.juniata.edu/citation/apa/index.htm
http://owl.english.purdue.edu/owl/resource/560/01/