

SCIENTIFIC THEORY AND PRACTICE

OSU BACCALAUREATE CORE, COLLEGE OF SCIENCE

WRITING INTENSIVE COURSE – FALL 2017 (3 CREDITS)

CLASS LOCATION & TIME:

MWF 12:00 – 12:50 AT (LEARNING INNOVATION CENTER) LINC 303

INSTRUCTOR

DR. KARI VAN ZEE

SENIOR INSTRUCTOR – BIOCHEMISTRY AND BIOPHYSICS DEPARTMENT

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OFFICE HOURS: W 10-11; OTHER TIMES BY APPOINTMENT

GRADUATE TEACHING ASSISTANT

JASON SCHINDLER

MASTERS STUDENT – ENVIRONMENTAL ARTS & HUMANITIES

OFFICE: **BALLARD 330** PHONE: TBA

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OFFICE HOURS: **HOURS TBA**; OTHER TIMES AND LOCATIONS BY APPOINTMENT

- Please use OSU student e-mail addresses for all course communications. •

AIMS OF THE COURSE

BB 317 / BI 317 aims to prepare students for scientific/technical careers by providing opportunities for them to approach problems scientifically, develop critical thinking and analytical skills, explore how scientific discoveries are made and communicated, and design a career map to achieve their goals. We will use in-class discussion forums as well as formal and informal written assignments to accomplish these goals.



COURSE PHILOSOPHY AND FORMAT

BB317 / BI317 is designed to provide students with multiple opportunities to develop strong critical thinking and communication skills essential in a variety of scientific careers. Throughout the term we will focus on:

- practicing clear and critical thinking
- applying vocabulary, terms, and conventions of scientific writing appropriate for the scientific field and relevant audience
- communicating ideas clearly, logically and in a manner appropriate to the audience.

We will also explore the “*everyday practice of science*” and consider the role of science and technology in society, who determines what research gets funded, how one gets money to do research, how discoveries of science are used in medicine and technology, career pathways in science, and how the public perceives science.

This course fulfills the Baccalaureate Core requirement for the WIC category. It does this by following the Writing Intensive Course guidelines defined at Oregon State University. Activities outlined further below allow for a focus on written communication and the writing and revising process in the sciences. WIC courses must focus at least 25% of the grade directly tied to written activity (and in this course, it is far more).

BACC CORE LEARNING OUTCOMES & WIC LEARNING OUTCOMES

FOR THE WRITING INTENSIVE COURSE LEARNING OUTCOMES, STUDENTS WILL:

- **Develop** and **articulate** content knowledge and critical thinking in the life sciences through frequent practice of informal and formal writing.
- **Demonstrate** knowledge/understanding of audience expectations, genres, and conventions appropriate to communicating in life science disciplines.
- **Demonstrate** the ability to **compose** a document of at least 2000 words through multiple aspects of writing, including brainstorming, drafting, using sources appropriately, and revising comprehensively after receiving feedback on a draft.

STUDENTS WILL DEMONSTRATE COMPETENCE IN AND KNOWLEDGE OF THE NATURE AND PROCESS OF SCIENCE BY:

- **Analyzing, evaluating** and **interpreting** evidence from peer-reviewed articles in the life sciences.
- **Discussing** and **judging** the conventions of peer review and publication in professional journals in the life sciences.
- **Producing** examples of the different kinds of writing used frequently by life scientists to communicate with fellow scientists and with the general public.
- **Evaluating** and **deconstructing** hypotheses used to design experiments to test hypotheses.
- **Evaluating** sources of information in the life sciences.

LEARNING RESOURCES

This course meets in class three times per week for 50 minutes. This course combines approximately 90 hours of instruction, group discussion, online activities, presentations, drafting, writing, revising written assignments, etc. for 3 WIC credits.

Materials used in the course will be made available online through the class Canvas portal. Students can access online the *Everyday Practice of Science* by Frederick Grinnell to read during the term. Login to the OSU Library (<http://osulibrary.oregonstate.edu/>) click the short link: http://bit.ly/Grinnell_OSULib, then navigate to the

New materials will be posted on the **Canvas site** on a regular basis.

You will need access to computing technology to compose written materials, access Canvas, and communicate via email. If you need further assistance with technology, please contact OSU Student Computing Services; they also have access to software you may need. (<http://is.oregonstate.edu/service-desk>)

We may use laptop computers from time to time in class. You may bring your own or request one from either the OSU Valley Library or contact Kari for use of a BB Departmental one. Details will be given in-class prior to those events.

Availability: Office hour times appear at the beginning of this document; check there for updated times and locations. I welcome you to contact me through office hours, email, or additional appointments to discuss your work and progress.

Jason will also be our graduate teaching assistant this term. He will also be available for office hours and describe other available times that may be requested via email.

EVALUATION & GRADING POLICIES

The class will not be graded on a curve. It is theoretically possible for the whole class to get an A or an F. No letter grades will be given before the final grade, although *you may discuss your standing with me at any time during the term*. Focus on improving your critical thinking and communication skills and the grade will align with that effort.

GENERAL OSU AND DEPARTMENTAL POLICIES

STATEMENT REGARDING STUDENTS WITH DISABILITIES

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

The DAS Statement is posted online at: <http://ds.oregonstate.edu/faculty-advisors>

STUDENT CONDUCT

The Department of Biochemistry/Biophysics and the Biology Program follow the university policies on student conduct. These can be found at:

<http://studentlife.oregonstate.edu/studentconduct/offenses-0>

Cheating or plagiarism by students is subject to the disciplinary process outlined in the Student Conduct Regulations. Students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as an intentional act of deception in one of the following areas:

Cheating – use or attempted use of unauthorized materials, information or study aids

Fabrication – falsification or invention of any information

Assisting – helping another commit an act of academic dishonesty

Behaviors disruptive to the learning environment will not be tolerated and will be referred to the Office of Student Conduct for disciplinary action.

“The goal of Oregon State University is to provide students with the knowledge, skill and wisdom they need to contribute to society. Our rules are formulated to guarantee each student's freedom to learn and to protect the fundamental rights of others. People must treat each other with dignity and respect in order for scholarship to thrive. Behaviors that are disruptive to teaching and learning will not be tolerated, and will be referred to the Student Conduct Program for disciplinary action.

Behaviors that create a hostile, offensive or intimidating environment based on gender, race, ethnicity, color, religion, age, disability, marital status or sexual orientation will be referred to the Affirmative Action Office.

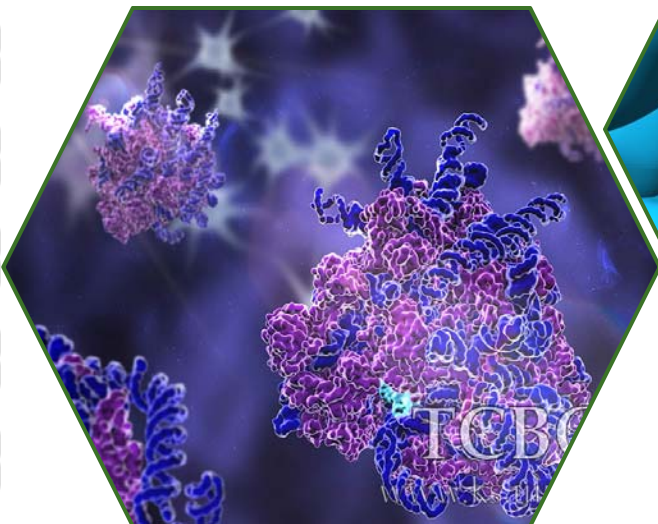


Figure 1: Ribosomes

Image courtesy Beckman Institute Theoretical Computational Biophysics Group, U. of IL, Urbana-Champaign; Kwok Yan Chan, 2014

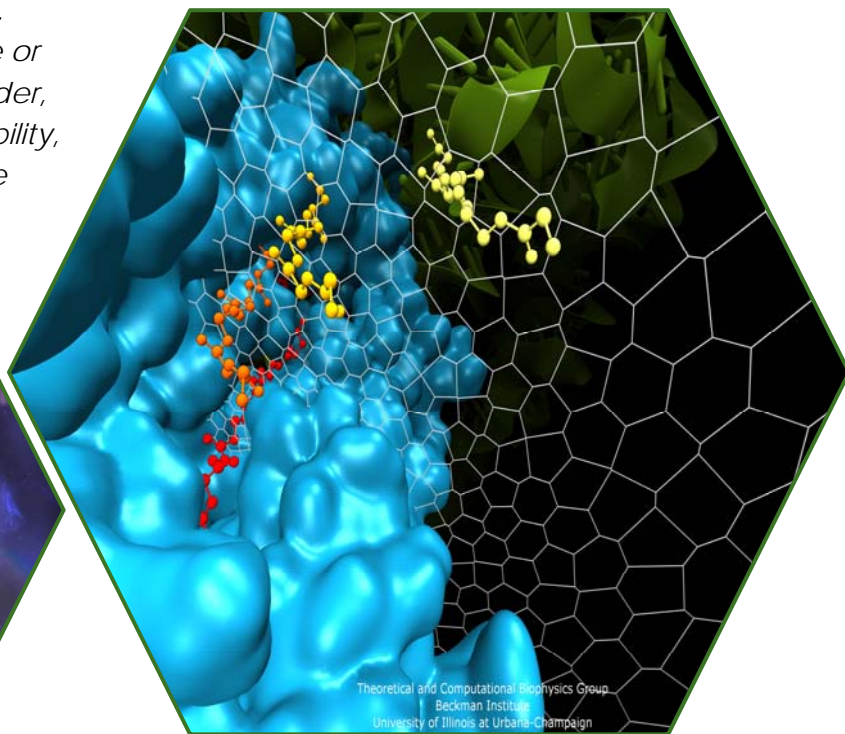


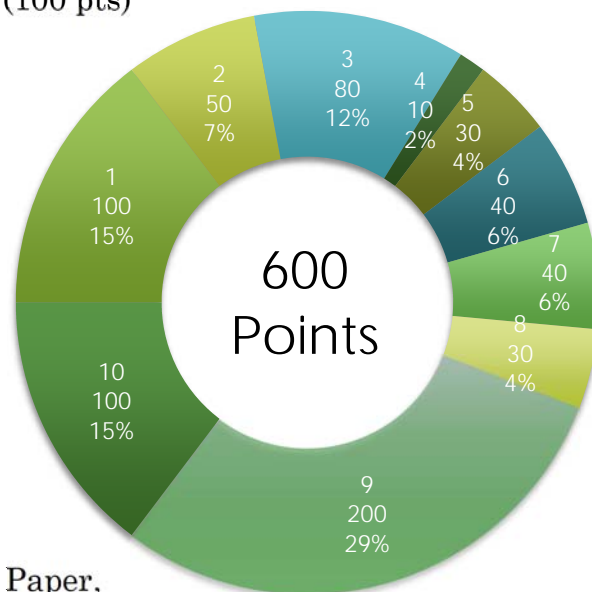
Figure 2: Nascent peptide chain diffusion around SecY channel.

Image courtesy Beckman Institute Theoretical Computational Biophysics Group, U. of IL, Urbana-Champaign

STUDENT ASSESSMENTS

Students will be assessed on a 600-point total for all assignments for the term. The point allocation is as follows:

1. Engagement in Class Activities and Discussions (100 pts)
2. Lead Journal Club Group Discussion (50 pts)
3. Informal Writing (80 pts): WIC 1: Reflection (10 pts), Grant Review exercises (30 pts) and Journal Club Preparation Questions (40 pts)
4. Attendance at a Scientific Lecture of choice (further details and guidelines will be given in class) before Week 8 of the term; written summary of the research and its significance (40 pts)
5. Ethics Training Certification (30 pts)
6. Formal written assignments (200 pts): (3 assignments: WIC 2: Comparative Document Analysis, WIC 3: Critical Analysis of a Scientific Paper, WIC 4: Science Outreach Grant Proposal)
7. Final Ten-Year Career Road Map (100 pts)



ASSIGNMENT FORMATTING, DUE DATES, EXTENSIONS, AND DEADLINES POLICY

Assignments with detailed guidelines will be posted on a regular basis. Writing assignments must be typed, and unless noted, double-spaced 12pt. font, one-inch margins, delivered as .doc / .docx / .pdf format, and carefully uploaded to Canvas. Some assignments such as the WIC 4: Grant Proposal may allow and require changes to this format. Contact one of the instructors or GTAs if there are special circumstances or other materials you may want to upload or any other questions about formatting.

WIC coursework expects students to learn to improve their writing skills by revising their work based on feedback from peers and instructors. Assignments will therefore be graded on the quality of the work (e.g., scientific thinking, clarity, accuracy, readability, completeness) and on the way in which the peer and instructor's feedback is incorporated in the revised work.

*Unless otherwise stated, assignments must be turned in by **MIDNIGHT (12am)** on the **DUE DATE** specified.*

Students will be expected to revise designated assignments and return along with the original assignment with instructor comments **within one week** from the date the assignment was returned.

***DUE DATES** will be indicated on the assignment guidelines and are listed on the class schedule.*

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Extensions are not granted for Journal Clubs, the final grant proposal submission, and the grant proposal review. If made at least two days before the due date, extensions of up to 2 days will be considered for the formal writing assignments. For other issues regarding meeting deadlines, talk to the instructor.

Late assignments will lose 10% of the points for the assignment for each day that they are late.

ASSIGNMENTS

CLASS PARTICIPATION

THIS ASSIGNMENT APPLIES THE COURSE LEARNING OUTCOME OF:

- **Develop** and **articulate** content knowledge and critical thinking in the life sciences through frequent practice of informal and formal writing.

BB 317 / BI 317 is a discussion-based course rather than a lecture-based course, and participation and engagement in discussions and activities is essential for success. Discussions and writing activities will be based on assigned readings that you must complete **before** coming to class.

To foster your development as an active learner, I expect all students to participate actively in both small group and class discussions throughout the course. Your engagement will be assessed on the extent, relevance, and the professionalism of your contributions to the discussions. Please note that attendance and participation are not the same thing.

In-class work will include working with other students to analyze data, formulate hypotheses, design experiments, lead and participate in journal club-style discussions, etc. Participation in class discussions and in class work will be graded on

- productive contributions demonstrating good scientific/critical thinking skills
- presenting evidence to support a position
- making a relevant response to someone else's remarks
- recognizing errors in someone else's or your own reasoning
- listening actively
- making a connection to another reading or topic previously discussed
- bringing other sources to the class's attention that provide food for thought (articles related to the topic under discussion, for example)
- practicing respectful and professional behavior

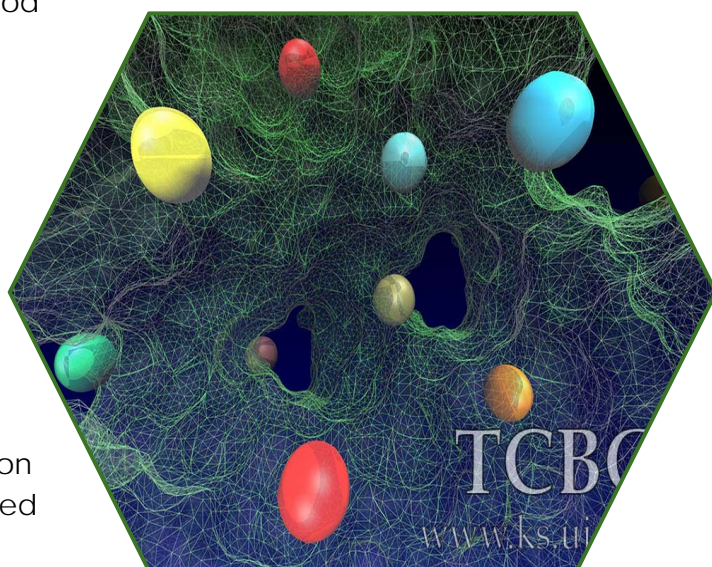


Figure 3: Electron Transfer in Cryptochrome

Image courtesy Beckman Institute Theoretical Computational Biophysics Group, U. of IL, Urbana-Champaign; Ilia Solov'yov, 2014

JOURNAL CLUB DISCUSSIONS

THIS ASSIGNMENT APPLIES THE COURSE LEARNING OUTCOMES OF:

- **Analyzing, evaluating** and **interpreting** evidence from peer-reviewed articles in the life sciences.
- **Demonstrating** knowledge/understanding of audience expectations, genres, and conventions appropriate to communicating in life science disciplines.
- **Developing** and **articulating** content knowledge and critical thinking in the life sciences through frequent practice of informal and formal writing.
- **Discussing** and **judging** the conventions of peer review and publication in professional journals in the life sciences.
- **Evaluating** sources of information in the life sciences.
- **Evaluating** and **deconstructing** hypotheses used to design experiments to test hypotheses.

An important component of the “practice of everyday science” is reading scientific articles published in peer-reviewed journals. Some of you may have experience reading journal articles for other courses you have taken or for a research lab of which you are a member. For others, this may be new experience.

Teams of 4-6 students will be formed at the beginning of the term and assigned a date in which to lead Journal Club. All students are expected to read all of the articles and resources and participate actively in the discussions.

To prepare for the journal club discussions, you will need to complete journal club discussion guide ahead of the discussion and post this to Canvas before the discussion. Students must attend the journal club discussion session in order to receive points for the submitted journal club discussion guide.

ATTEND A SCIENTIFIC TALK

THIS ASSIGNMENT APPLIES THE COURSE LEARNING OUTCOMES OF:

- **Discuss** and **judge** the conventions of peer review and publication in professional journals in the life sciences.
- **Develop** and **articulate** content knowledge and critical thinking in the life sciences through frequent practice of informal and formal writing.

Each student is required to **attend** in person during Fall 2017, between weeks 1-8, a scientific research talk (e.g. invited researcher, Masters or Ph.D. level defense seminar, or scientific public lecture) in a field of interest **and** write a **one-to-two page summary** before the end of week 8 summarizing the project topic, briefly discussing the methods used, commenting on the significance of the research to the field, and critiquing the ability of the scientist to communicate effectively. Each student will be asked to summarize and comment on at the beginning of class the presentation they attended (2-5 minutes). Lab meeting presentations do not count. More details will be discussed in class.

FORMAL WRITING ASSIGNMENTS AND REVISIONS:

THIS ASSIGNMENT APPLIES THE COURSE LEARNING OUTCOMES OF:

- **Develop** and **articulate** content knowledge and critical thinking in the life sciences through frequent practice of informal and formal writing.
- **Demonstrate** knowledge/understanding of audience expectations, genres, and conventions appropriate to communicating in life science disciplines.
- **Demonstrate** the ability to compose a document of at least 2000 words through multiple aspects of writing, including brainstorming, drafting, using sources appropriately, and revising comprehensively after receiving feedback on a draft.
- **Producing** examples of the different kinds of writing used frequently by life scientists to communicate with fellow scientists and with the general public.

Informal and Formal Writing Assignments: Additional reading and in-class writing assignments will be announced throughout the term:

- COMPARATIVE DOCUMENT ANALYSIS
- CRITICAL ANALYSIS OF A SCIENTIFIC PAPER
- SCIENCE OUTREACH GRANT PROPOSAL

FINAL TERM PAPER: TEN-YEAR CAREER ROADMAP

THIS ASSIGNMENT APPLIES THE COURSE LEARNING OUTCOMES OF:

- **Develop** and **articulate** content knowledge and critical thinking in the life sciences through frequent practice of informal and formal writing.
- **Producing** examples of the different kinds of writing used frequently by life scientists to communicate with fellow scientists and with the general public.

Students will complete a Ten-Year Career Roadmap. I will post the instructions at the beginning of the term. Some of the components will require advanced preparation and draft submission, so be sure to review the assignment expectations at the beginning of the term.

