

**CHEN 5805 – Biological Interactions to Biomaterials**  
Course Syllabus – Fall 2020

**Instructor:** Stephanie J. Bryant  
Email: stephanie.bryant@colorado.edu

**Meeting Time:** Monday and Wednesday 12:00-1:15 pm

**Office Hours:** Monday 2:00-3:00 pm by appointment

**Meeting**

**Location:** Remote via Zoom  
<https://cuboulder.zoom.us/j/92782533012>  
Meeting ID: 927 8253 3012  
Passcode: 492897  
Used for all meetings (class, office hours, etc.).  
Additional information can be found on Canvas.

**Zoom Protocol:** Everyone is expected to keep their video on during the class and to remain muted unless asking a question or presenting. We will utilize the raise hand feature and the chat function for questions. Questions will be taken in the order received. Please utilize this feature throughout the lectures and at the end of the journal presentation and during the discussion period. During the lecture portion of the class, we will utilize breakout session function for in-class small group assignments. The instructor will randomly assign ~3 students per breakout session to work together on in-class assignments. We will then reconvene as a group to discuss.

**Lecture**

**Recording:** The lecture-based classes will be recorded and uploaded onto Canvas and accessible only to those enrolled in the class. Recording of the journal presentation are not planned.

**Course Website:** We will use Canvas.  
Log-on with your identikey username and password  
(will contain announcements, course material, etc.)

**Email List:** Email will be used for general correspondence and all announcements. An email list will be generated from the class roster. Be sure to check your CU email account!

**Recommended**

**Text:** [Biomaterial Science: An Introduction to Materials in Medicine](#) Edited by William R. Wagner, Shelly E. Sakiyama-Elbert, Guigen Zhang, and Michael J. Yaszemski, Academic Press, 4<sup>th</sup> Ed, 2020.

**Course**

**Objective:** This course will provide an in-depth view of biomaterials with a specific focus on biological interactions with materials. The class will focus on the five main topics: introduction to types of biomaterials, protein and cell interactions with biomaterials, the innate and acquired immune response to biomaterials, blood-specific interactions with biomaterials, and biomaterial-related infection.

**Grading:** Class participation:  
In-Class Assignments 10%  
In-Class Discussion 5%

Assessment Quizzes (5)	25% (5%/each)
Journal Presentations (2)	25% (10% 1 <sup>st</sup> ; 15% 2 <sup>nd</sup> )
Final Project	35%

**In-Class Assignments (10%):** During the lecture portion of the course, there will be in-class assignments that will be done in groups but turned in individually on Canvas at the end of class.

**Assessment Quizzes (25%):** There will be five quizzes throughout the semester to test your knowledge on each of the five main topics covered in the course. The quizzes will be administered through Canvas and will be self-paced. The quizzes will be available starting at 8 am the day after the end of lecture and close just before midnight (11:59 pm) the day before the start of the next topic. The quizzes may comprise any combination of multiple choice, T/F, and short answer. You will be required to take the quiz on your own. Additional information will be provided on Canvas.

Quiz Topic	Quiz Opens (8am)	Quiz Closes (11:59 pm)
#1: Introduction to Biomaterials	September 1, 2020	September 15, 2020
#2: Protein and Cell Interactions	September 24, 2020	October 6, 2020
#3: Immune Response	October 15, 2020	October 27, 2020
#4: Blood-biomaterial interactions	November 3, 2020	November 15, 2020
#5: Biomaterial infection	November 19, 2020	November 29, 2020

**Journal Presentation (25%):**

- Students will work in groups of 3 unless otherwise instructed, which have been pre-assigned by the instructor. Each group will be assigned to a journal article and the day to present. The assignment will be on Canvas.
- Each group is expected to prepare a 30 minute presentation. The journal article will be an original research article. Here are some guidelines for the content to include in the presentation:
  - Background that motivates the proposed study for research articles and motivates the need for a comprehensive review for review articles. Additional literature/background research is expected.
  - The presentation should include the proposed question/hypothesis/objective that the study addresses. The presentation should describe the methods used in the study. For each method, please describe in detail how it works, what information is gained, are there any limitations? I expect that this will require additional background research and that you will prepare one or two slides for each method. A detailed description of all the results presented in the journal article should follow. Finally, a discussion of the results should be presented and should include what new information is gained. In particular, I would like your group to put the findings of the study in context of how it adds to our growing understanding of biomaterials and how the findings relate back to the original question/hypothesis/objective proposed. I also encourage your group to think critically about the paper and what information may be lacking, what else is needed to better answer the original question, are there key follow up studies that could be done to address the limitations of the study? Remember the textbook for the class is an excellent resource.
  - For some papers, there may be supplemental information (e.g., methods, data, results, etc.) that accompany the paper and which can be found on the publisher’s website. Note that access will require either use of VPN or the University Library and log-in using your identikey.

- For those not presenting the article, you will be expected to read the article before class and submit the following to Canvas in the form of a quiz. The quiz will close by 10 am on the day the article will be presented. Each quiz will be the same and you will be asked to provide the following: (1) three questions that you have about the article, (2) the strengths of the article, and (3) the shortcomings of the article. Quizzes are titled ‘Quiz – Journal Article #X’ where refers to the journal number. All journal articles are uploaded on Canvas.
- We will have a 30 minute discussion of the article and everyone will be expected to participate in the discussion (this will be 5% of your grade – see next section). I will end the discussion with 5-10 min before the end of class and give my perspective on the article.
- Each student will present two articles throughout the semester. The first presentation will be weighted slightly less at 10% of your final grade. The second presentation will be 15% of your final grade.

**In-Class Discussion (5%):** Everyone not presenting is expected to participate in the discussion after each journal presentation.

**Final Project (35%):** Students will work either individually (*via* option 1) or in groups of 2-3 (*via* option 2) to prepare a research proposal that focuses on the development of a novel biomaterial or a new biomaterial application. The research proposal will follow the guidelines for the Ruth L. Kirschstein National Research Service Award (NRSA) Individual Predoctoral Fellowship (Parent F31). Guidelines and links for the proposal will be placed on the Canvas. The proposal consists on a 1 page *Specific Aims* page and a 6 page *Research Strategy* for a total of 7 pages. Note the page limits are for single space and 0.5” margins. There is no page limit for references.

Option 1: If you have begun on a research project and it has a biomaterials component to it, you may choose to write an individual research proposal based on your own research. You will be expected to include preliminary data in support of your research proposal that is either your own data or data generated from your lab.

Option 2: You will work in a group of three and select a principal investigator (PI) that has a recently funded NIH grant. You will base your proposal off of their current proposal and use their published work as preliminary data. Additional information will be provided on Canvas.

Important dates:

<u>Due Date</u>	<u>Action Item*</u>	<u>Additional Notes</u>
5:00 pm, Th, Sept 24, 2020	Confirm <i>option 1</i> or <i>option 2</i> on Canvas.	
5:00 pm, Th, Oct 8, 2020	Draft of specific aims (1 page)	I will return feedback on or around October 15, 2020
5:00 pm, Fr, Nov 6, 2020	Draft of research strategy (6 pages)	I will return feedback on or around Nov 15, 2020
5:00 pm, Mon, Nov 30, 2020	Final specific aims and research strategy	
11:59 pm, Th, Dec 3, 2020	Reviews due	

\*all assignments will be turned in electronically on Canvas

**Excuses:** I expect everyone to attend and participate in each class. Please see procedures and policies on the following page for additional information.

## **Policies and Procedures:**

### *CLASSROOM BEHAVIOR*

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the policies on [classroom behavior](#) and the [Student Code of Conduct](#).

### *REQUIREMENTS FOR COVID-19*

As a matter of public health and safety due to the pandemic, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements, and public health orders in place to reduce the risk of spreading infectious disease. Required safety measures at CU Boulder relevant to the classroom setting include:

- maintain 6-foot distancing when possible,
- wear a face covering in public indoor spaces and outdoors while on campus consistent with state and county health orders,
- clean local work area,
- practice hand hygiene,
- follow public health orders, and
- if sick and you live off campus, do not come onto campus (unless instructed by a CU Healthcare professional), or if you live on-campus, please alert [CU Boulder Medical Services](#).

Students who fail to adhere to these requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to [Student Conduct and Conflict Resolution](#). For more information, see the policies on [COVID-19 Health and Safety](#) and [classroom behavior](#) and the [Student Code of Conduct](#). If you require accommodation because a disability prevents you from fulfilling these safety measures, please see the "Accommodation for Disabilities" statement on this syllabus.

Before returning to campus, all students must complete the [COVID-19 Student Health and Expectations Course](#). Before coming on to campus each day, all students are required to complete a [Daily Health Form](#). **Because this class will be taught remote, you will not be required to complete the Daily Health Form.**

Students who have tested positive for COVID-19, have symptoms of COVID-19, or have had close contact with someone who has tested positive for or had symptoms of COVID-19 must stay home and complete the [Health Questionnaire and Illness Reporting Form](#) remotely. In this class, if you are sick, **you will need to alert the instructor about your absence due to illness. For the days that you are absent due to illness, your class participation will not be counted. If you are absent due to illness for your assigned journal presentation, you will be excused.**

### *ACCOMMODATION FOR DISABILITIES*

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or [dsinfo@colorado.edu](mailto:dsinfo@colorado.edu) for further assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.

### *PREFERRED STUDENT NAMES AND PRONOUNS*

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

## HONOR CODE

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code ([honor@colorado.edu](mailto:honor@colorado.edu)); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the [Honor Code Office website](#).

## SEXUAL MISCONDUCT, DISCRIMINATION, HARASSMENT AND/OR RELATED RETALIATION

The University of Colorado Boulder (CU Boulder) is committed to fostering an inclusive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, or protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or [cureport@colorado.edu](mailto:cureport@colorado.edu). Information about the OIEC, university policies, [anonymous reporting](#), and the campus resources can be found on the [OIEC website](#).

Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, dating and domestic violence, stalking, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

## RELIGIOUS HOLIDAYS

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. **In this class, the student must notify the instructor within the first week of the semester of any conflicts with regard to their assigned presentation times.** See the [campus policy regarding religious observances](#) for full details.

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