

Course Syllabus
BIOTRAIN 720: Grant Writing for Biomedical Scientists
M-W-F 8:30-9:30AM JONES 143 (Lectures)
3 Credit Hours

Fall 2021

In Person/Face-to-Face

Course Director: Beth Sullivan, PhD
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Course Instructors and/or Study Section Chairs:

1. Dr. Douglas Marchuk (Genetics and Genomics) (SS in 208 CARL)
2. Dr. Steve Lisberger (Neurobiology) (SS in Bryan 301)
3. Dr. Brigid Hogan (Cell, Developmental, and Stem Cell Biology) (SS in 415 Jones)
4. Dr. Bernard Mathey-Prevot (Cancer Biology and Pharmacology) (SS in LSRC C234)
5. Drs. Micah Luftig/John Rawls/Jorn Coers (Infectious Disease and Immunology) (SS in 0010 CARL)
6. Dr. Beth Sullivan (Genome Engineering and Human Disease) (SS in 1125 MSRB 3)

Class Delivery: Classes will be held as in-person lectures and study sections. The in-person lectures will be held in Jones 143. The location of each study section will be communicated within the first month of the course.

Office Hours: Available by appointment with Course Director, specific lecturers, and/or study section chairs via Zoom, in person, or other arrangement.

COVID reminders and policies: All students and faculty reviewers are expected to follow current Duke safety policies, including wearing masks/face coverings, maintaining physical distancing as appropriate, and adhering to other safety guidelines. Please be aware of [health resources](#) for students, including [wellness](#) and [mental health](#). Together we can help prevent COVID-19 spread by being vaccinated, wearing masks while indoors, and complying with weekly surveillance testing. For updates, please visit the [Duke United](#) site often.

Instructor Communications: E-mail communication is welcome at any time. NOTE: If you do not receive a reply from the course director or a study section chair within 24 hours, then assume that they did not receive it and re-send it. Please include some type of identifier in the “Subject” section of your email (something like BIOTRAIN 720) to assist the recipient in linking the email to the class.

This course syllabus will remain posted under the link on the left side of the page labeled “**Syllabus Page**” and under “**Resources**”.

Text: Primary literature and/or sample grants provided by instructors.

Course Overview

Scientific and grant writing is a foundational skill for biomedical scientists to communicate their research

results and to acquire funding for their research programs. In this course, PhD students will learn basic concepts in critical thinking about scientific ideas and integrating them with grant writing and peer review, such as how to ask a scientific question, formulate a testable scientific hypothesis, and critique feasibility and scope of a scientific proposal. Students will participate in self-paced instructional lectures, learning the foundations of grant writing and how to craft the specific sections of an NIH-style proposal. By writing a grant application based on their research, students will become familiar with crucial written scientific communication skills necessary to craft a well-designed research plan, including significance of the research problem, gaps in current knowledge, experimental approaches, anticipated data outcomes, and alternative solutions. In addition, by reading and formally critiquing their colleagues' proposals, students will develop broader critical thinking and analytical skills that will enable them to confidently and constructively evaluate the merits and feasibility of scientific proposals related to their field of study or general area of research.

Furthermore, this course will help students prepare to submit a grant proposal to a funding agency, but the content and format required by the agency may require considerable changes in the document. The principles students learn in this course will also prepare them for the written elements of their prelim examinations and with any grant proposal they may submit, but for this course, they cannot alter the format or the content of the proposal to fit their specific program's prelim requirements.

Course Objectives

The two major course objectives and their Student Learning Outcomes (SLOs) are as follows:

Objective 1: To prepare students for writing a robust Scientific Grant Proposal

SLOs: Students will be able to:

- conceive an exciting and scientifically sound research plan that would be responsive to funding agencies.
- translate these nascent ideas into a well-designed set of Specific Aims.
- build on these aims to create a well-reasoned and well-written grant proposal.
- write to the reviewers' expectations and scientific caliber in the field.
- respond to reviewer critiques in a way that leads to a stronger revised proposal with fewer scientific and grantsmanship weaknesses

Objective 2: To prepare students for critically reviewing a Grant Proposal.

SLOs: Students will be able to:

- critically review a research proposal, including scientific premise, significance, and experimental plan.
- write a constructive review of a proposal, identifying strengths and weaknesses.
- participate in a group review of research proposals by offering clear, concise, and constructive scientific feedback.
- rank proposals on a broad range of topics and approaches by comparing the number of strengths and weakness.

Course Requirements

The students will:

1. attend synchronous lecture sessions and topical study section sessions, watch asynchronous lecture videos online, read sample proposals/chapters/notes (per class requirements).
2. participate in assigned activities, such as drafting a grant proposal in different successive phases (Specific Aims, Significance, Research Plan, Training Plan), write a constructive review of a proposal, write to the reviewers' critics, evaluating colleagues' proposal following NIH Rubrics.

3. write a complete grant proposal, including incorporating revisions after review.

Layout of the Course-Room

This is a lecture and discussion (study section)-based course that contains learning sessions that cover grant agencies, format and structure of grant applications, concepts in peer review, best practices in articulating study design and data outcomes, and crafting biological significance and training statements. Content in synchronous sessions includes participating in live lectures and topical/thematic Study Sections, where students write an NIH-style fellowship proposal and provide oral and written evaluation and critique of other proposals presented in class. There will be ~6 Study Sections (SS) that have:

- up to 12 students per SS, plus a faculty SS Chair.
- Guest faculty reviewers will participate in proposal review (oral and written comments), usually for two grants.
- All Breakout (study section discussion) sessions in **blue font, purple font, or magenta font** in the **Course Schedule** will be with your SS (location to be communicated the first week of class)
- No bartering to be in a different SS.

Assignment of Proposals to Study Sections (SS): Before or during the first week of class, all students will complete an online survey to provide their name, PhD program, PI/lab, grant proposal title, and the top two study sections that most closely align with their proposal topic. This information will be used to distribute students into the appropriate thematic study sections and to identify faculty from among the SoM training faculty with the appropriate expertise to review individual proposals. The Course Director will confer with SS chairs who will confirm student assignments within their SS.

Course Expectations - Students

By writing your proposal along the lines of the expectations of reviewers, you will learn about grant proposal writing but also about grant review. By participating in the review process, especially group review, you will become a better grant reviewer, and by understanding reviewer expectations, an even better grant proposal writer.

Thus, the two parts of the course (writing and review) inform and augment each other. It is crucial therefore that you participate in the review process, not just the writing. The course requires each of you to serve as an assigned proposal reviewer for two of your colleagues and expects you to participate orally in the review of ALL the proposals in your SS.

The **Resources** page lists the units/classes for the course, of which there are 12 asynchronous lecture units. Within each of these unit folders, there is a unit description, learning objectives, a link to notes and other resources. Folders with sample proposals or sections of proposals will also be located under Resources.

The **Announcement** function will be used frequently to post important information within the course room to all students. These will appear as pop-up messages and thus it is imperative that you have the capability of viewing pop-ups for this site (please check browser settings for this course).

The **in-course email function** (labeled “**Email**” on the list of functions on the left) can be used to contact the Course Directors or Study Section chairs, or to send private messages to individual students or the entire class.

Lecture Unit Assessments:

There are 10 units/classes total that contain lecture materials to be completed. Attendance at lectures and participation in the in-class discussion is expected and contributes to the final grade.

Assessment of Peers' Proposals

Each student will evaluate all specific aims and significance sections for their study section. Each student will be assigned two full proposals (and their revisions) to assess, and each proposal will receive three evaluations (two peers, one faculty). Written comments on the sections or full proposal are due by 11:59PM on the day before the section or full proposal is due.

Guidance and policies for Class Critiques and Study Sections can be found in Sakai under "Resources" in the folder named "Critiques and Study Section Guidelines".

Course Expectations - SS Chairs and Faculty Reviewers

Student proposals will be assigned to one thematic study section. Each study section will be chaired by the same faculty member throughout the semester and be associated with up to 6 faculty reviewers (depending on number of students in SS). The SS Chair is responsible identifying faculty reviewers, assigning proposals to faculty and student reviewers, and for guiding the class critiques of the Specific Aims and Significance/Innovation sections. The Course Director is available to help SS chairs find and assign faculty to review two full proposals and revisions of the same two proposals.

Full proposal reviewers will be drawn from SoM, A&S, and Pratt training faculty with relevant expertise. BIOTRAIN 720 participating faculty are expected to read two Full Proposals and provide constructive feedback both verbally and in written form. Written critiques should be shared with applicants no later than the end of the day of the assigned study section date.

Expectations for SS Chairs and Faculty Reviewers can be found under "Resources".

Academic Misconduct:

Be sure to read the Duke policy on Academic Misconduct, specifically Student Cheating and Plagiarism (<https://studentaffairs.duke.edu/conduct/z-policies/academic-dishonesty>).

Accommodation of Student Needs:

Students needing special arrangements for note taking, special print, or other considerations for successful completion of the course should contact the instructors before or within the first week of class so reasonable accommodations can be made.

Class Schedule:

Date	Topics/ Units	Delivery Method	Assignments Due
Aug 23	Developing an Idea and Specific Aims (Doug Marchuk)	Jones 143	n/a
Aug 25	Sample Specific Aims Pages (Doug Marchuk)	Jones 143	Read Sample Specific Aims Page NIH
Aug 27	Significance and Innovation Sections (Doug Marchuk)	Jones 143	Read Sample Significance and Innovation Sections
Aug 30	Approach / Design and Methods / Preliminary data (Doug Marchuk)	Jones 143	Read Sample Approach Section
Sept 1	Career Development and Training Plans (Doug Marchuk)	Jones 143	Read Sample Development and Training Plans
Sept 3	Drug Discovery Grant Proposals (Kris Wood)	Jones 143	All SPECIFIC AIMS Pages due to by 12 noon to entire SS
Sept 6	SS Critiques of Specific Aims Page	in person SS	Group 1 discussion – 4 students
Sept 8	SS Critiques of Specific Aims Page	in person SS	Group 2 discussion – 4 students
Sept 10	SS Critiques of Specific Aims Page	in person SS	Group 3 discussion – 4 students
Sept 13	What Happens at Study Section? (Doug Marchuk)	Jones 143	
Sept 15	Responding to Critiques & Writing Helpful Reviews (Doug Marchuk)	Jones 143	
Sept 17	The NIH System (Doug Marchuk)	Jones 143	
Sept 20	RCR/R&R in Grant Writing and Biases in Grant Review (Micah Luftig)	Jones 143	please view the pre-work/video lectures before class on 9/20
Sept 22	<i>no class-writing</i>		
Sept 24	<i>no class-writing</i>		All SIGNIFICANCE and INNOVATION sections due by 12 noon to entire SS
Sept 27	SS Critiques of Significance/Innovation Section	in person SS	Group 1 discussion – 4 students
Sept 29	SS Critiques of Significance/Innovation Section	in person SS	Group 2 discussion – 4 students
Oct 1	SS Critiques of Significance/Innovation Section	in person SS	Group 3 discussion – 4 students
Oct 4	<i>no class- writing</i>		
Oct 6	<i>no class- writing</i>		
Oct 8	<i>no class- writing</i>		
Oct 11	<i>no class- writing</i>		
Oct 13	<i>no class- writing</i>		
Oct 15	<i>no class- writing</i>		

Oct 18	<i>no class- writing</i>		
Oct 20	<i>no class- writing</i>		
Oct 22	<i>no class- reading proposals, writing critiques</i>		1st version of Proposal due to entire SS: All students by 12 noon
Oct 25	<i>no class- reading proposals, writing critiques</i>		
Oct 27	Mock Study Section: Original (Students 1-2)	in person SS	
Oct 29	Mock Study Section: Original (Students 3-4)	in person SS	
Nov 1	Mock Study Section: Original (Students 5-6)	in person SS	
Nov 3	Mock Study Section: Original (Students 7-8)	in person SS	
Nov 5	Mock Study Section: Original (Students 9-10)	in person SS	
Nov 8	Mock Study Section: Original (Students 11-12)	in person SS	
Nov 10	<i>no class – writing/reading revisions, writing critiques</i>		Revised Proposal Due Students 1-2
Nov 12	<i>no class – writing/reading revisions, writing critiques</i>		Revised Proposal Due Students 3-4
Nov 15	Mock Study Section: Revisions (Students 1-2)	in person SS	Revised Proposal Due Students 5-6
Nov 17	Mock Study Section: Revisions (Students 3-4)	in person SS	Revised Proposal Due Students 7-8
Nov 19	Mock Study Section: Revisions (Students 5-6)	in person SS	Revised Proposal Due Students 9-10
Nov 22	Mock Study Section: Revisions (Students 7-8)	in person SS	Revised Proposal Due Students 11-12
Nov 29	Mock Study Section: Revisions (Students 9-10)	in person SS	
Dec 1	Mock Study Section: Revisions (Students 11-12)	in person SS	
Dec 3			
Dec 6	Scores for each A1 revision grant in SS Due at Noon	action item	Rank order list submitted using Qualtrics survey

color key:

study section chair responsibility

study section chair, student reviewers, and faculty reviewer responsibility (SS chair leads review of 2 grants – 30 mins/grant; 1 faculty reviewer/2 grants per class)

study section chair, student reviewers, and faculty reviewer responsibility (SS chair lead review of 2 revised grants – 30 mins/grant; same faculty reviewer assigned to review A1 revision of same A0 proposals)

important points to remember:

- students submit original (A0) proposals on same day so that students whose proposals are reviewed later do not have “unfair advantage”
- please submit proposals by email to your study section; see Sakai for a list of email addresses for each study section
- every student has the same amount of time (~2 weeks) to revise (A1) proposals
- revised proposals are submitted before Thanksgiving (i.e. all grant writing is completed before Thanksgiving)
- submission dates give faculty reviewers ~5 days to review first set of original (A0) proposals and all revised (A1) proposals