DEPARTMENT OF CHEMISTRY
CHEM-GA 3200
Original Research Proposal
Fall 2022

Course Description. CHEM-GA 3200 is a required one-credit one-semester course for third-year graduate students pursuing a Ph.D. degree in the Department of Chemistry. The course covers topics related to research proposals in all fields of chemistry, including the conception and writing of innovative proposals as well as the associated review process. Each student will be tasked with creating an original research proposal that will be aided, and then reviewed, by peer teams that emulate NSF review panels or NIH study sections. As such, the course will provide guidance for the written and oral component for the 3rd year Original Research Proposal (ORP) exam early in the spring semester of Y2023, as well as for proposals intended to secure resources in future careers.

Course Web Site: NYU LMS Brightspace
Lecture times: Wednesday 9:30 AM – 10:45 AM
Lecture format: In-person
Location: Kimmel, Room 803
Instructor: Michael D. Ward (MDI laboratories, Brown 554, mdw3@nyu.edu)
Drop-In Chats: Th 10:00 AM – 11:00 AM; Brown 554

Suggested Reading Material (items 1-4 available from the instructor for 48-hour loan). Items 5 – 10 can be found on the internet but also will be available on the Brightspace course website.

4. Steven King, On Writing.
10. Proposals written by your PhD advisor (both awarded and declined) can be a rich resource.

Grade. Pass/fail: A grade of Pass is contingent on timely submission of assignments, including submission of an original research proposal prior to the due date, as indicated in the class schedule.

Course Objectives and Structure. Proposals are essential for securing resources for research pursuits, whether in academia, large industrial research firms, or startups. Recognizing that it is not feasible to cover every possible proposal format, the course will be limited to exercises that emulate the NSF and NIH processes, including the format of the original research proposal as well as reviews by peer teams, which emulate review panels and study sections. Many students, however, enter careers in industry or startups, where proposals are equally important for pitching ideas and securing resources for new and existing projects. Consequently, the course will include a panel session devoted to proposal strategies for entrepreneurial activities in academia, industrial settings, and startups.

The course meets weekly for 75 minutes, kicking off with two lectures during the first two weeks that will
address some essentials of proposal ideation and writing as well as the roles and responsibilities of peer reviewers. We will organize peer teams, consisting of four students each, based on expertise matching (as best as possible). These teams meet regularly during class sessions to provide a sounding board for each of their members through informal and constructive feedback as their respective proposal ideas are formulated. This includes the creation of a preliminary proposal that will serve as a starting point for a complete ORP, which then will serve as a springboard for the written component of the 3rd year ORP exam. As the semester progresses, these peer teams will transition to a formal role as peer reviewers, supplying written reviews for the preliminary proposal and the ORP, which can be used by each student to refine their proposal toward a final version for their ORP exam.

**COURSE ASSIGNMENTS**

**Where to submit.** All assignments are to be submitted to the Brightspace course site, through the Assignments section. Only the instructor has access to documents submitted as an assignment. The instructor then will distribute proposals and reviews to the appropriate students.

**IMPORTANT:** Any files uploaded to the Brightspace course site must have descriptive filenames in the following format: *Your Surname_ CHEM-GA 3200_Assignment Name*. For example, *Ward_Chem-GA 3200_Preliminary Proposal*.

**One-page summary of PhD thesis.** Students submit a one-page description of their thesis project by the date indicated on the schedule below. These summaries will be used to construct peer review teams with appropriate expertise, but they also will serve as a vehicle for each student to reflect on formulating a proposal topic that is within the expert area but truly distinct from their thesis research, which will be one of the criteria used by the peer review teams. The formatting of this one-page summary (e.g., fonts and font size, spacing, etc.) is identical to that for the ORP (see below).

**Preliminary proposal.** Students submit a two-page preproposal by the date indicated on the schedule below. The two-page limit does not include references; these should be included on a separate page(s) at the end of the document. The proposal should include a high-quality graphic on the first page that captures the overall goal of the proposed project. This is a challenge, but it is an essential tool for consolidating and conveying your idea to decision makers. This document should be written either using an NSF-like format based on “Intellectual Merit” or an NIH-like format based on “Specific Aims.” The formatting of this two-page preliminary proposal (e.g., fonts and font size, spacing, etc.) is identical to that for the ORP (see below).

**Original Research Proposal.** In accordance with the guidelines for the required departmental ORP, your written proposal should: (i) identify a research topic in chemistry unrelated to your dissertation research; (ii) explain the importance of the topic in a broad context; (iii) describe a project that falls within the scope of the topic; (iv) describe the overall aims (a.k.a. objectives) of the project; (v) describe how the project would be performed (a.k.a. a research plan) and how its feasibility would be demonstrated; (vi) describe the results anticipated upon completion. Experimental proposals should include details of the experiments needed for project completion, whereas theoretical/computational proposals should describe specific calculations, methodologies and theoretical frameworks. The review criteria by the peer review teams will include (i) significance; (ii) innovation; (iii) originality; (iv) technological impact; (v) societal impact, if relevant.

The text and figures in the document, including text in figures, should be clear and legible, and conform to the following requirements, some of which are adapted from NSF Guidelines (from the NSF Grant Proposal Guide):

- **The ORP should include a “Project Description” and “References Cited” only. Do not include other sections required by funding agencies, such as biosketches, budget pages, equipment, etc.**
- **The Project Description should not exceed five (5) pages, exclusive of references;**
- **Allowed fonts include Arial, Courier New, or Palatino Linotype with a font size of 10 points or larger; Times New Roman with a font size of 11 points or larger; Computer Modern Family of fonts with a font size of 11 points or larger;**
No more than 6 lines of text within a vertical space of 1 inch;
Margins in all directions, must be at least one inch.

Short talks (PowerPoint Assisted). A short PowerPoint presentation of their ORP that is no longer than eight minutes, including two minutes reserved for questions. Your presentation should include no more than six slides, including a title slide. Giving a short presentation is an artform, but the intent is to prepare you for the 15-minute presentation in the ORP exam and to hone your skills for explaining your ideas in a brief, but impactful, way. Describing something concisely is a challenge. As stated by the French philosopher and mathematician Blaise Pascal in his Lettres Provinciales: “Je n’ai fait celle-ci plus longue que parce que je n’ai pas eu le loisir de la faire plus courte,” which translates roughly as “I would have written a shorter letter, but I did not have the time.” (Letter XVI, 1657). This thought has been attributed to many others, some incorrectly, including John Locke, Benjamin Franklin, Henry David Thoreau, Mark Twain, and Cicero. You will likely find this to be true as well.

You are required to upload your presentation prior to the date of your presentation, in PDF format, to the assignment page of the course website corresponding to your team.

OTHER COURSE ELEMENTS

Panel I: Proposals in Academia. Proposals are crucial to securing funding in any academic research enterprise, and chemistry is not exception. This panel will address strategies and tactics for funding across a wide range of funding agencies, including how to configure proposals according to the larger goals of these agencies as well as specific solicitations. The panelists will describe their approaches to proposals from a variety of sources, including the National Science Foundation, the National Institutes of Health, the Department of Energy and Departments of Defense, the industrial sector, and foundations. Panelists: Prof. Glen Hocky; Prof. Marvin Parasram; Prof. Marcus Weck.

Panel II: Proposals in Industry and Startup Ventures. Proposal writing and “pitching” your ideas is an important skill in any venue, including industry and startup ventures. Entrepreneurial activities are becoming a staple within universities. Scientists and engineers in large industrial laboratories often write proposals with research aims, or requesting support for internship/co-op students, postdocs, external collaborations, new capabilities, and instrumentation. These proposals typically are submitted and evaluated by a panel of scientists or senior leaders, based on criteria that address project goals, background, innovative aspect of the proposal, alignment with the company’s strategy, experimental approaches, project timelines, publication strategy and intellectual property concerns. The same can apply to startup proposals submitted to government agencies or venture capital entities, though the requests for resources may be targeted toward more specific ends, such as prototype development or commercialization. Panelists: Prof. Jin Montclare (NYU); Dr. Laura Philips (Spheryx, Inc.); Dr. Timothy Rhodes (Merck & Co., Inc.)

Peer teams. Enrolled students will be organized into teams who meet regularly during class sessions, serving as a sounding board for each of their members, providing informal and constructive feedback to each other as their respective proposal ideas are formulated. We will strive to ensure that at least two members of each team has a reasonable overlap of expertise with the content area of the proposal under review. Later in the semester, team members will serve as peer reviewers, with each proposal assigned to a primary reviewer, a secondary reviewer, and a tertiary reviewer. As such, each student will be responsible for the peer review of roughly 3-4 proposals according to a matrix provided by the course instructor. Each reviewer will prepare a written review, the team then will meet to discuss their reviews (in the absence of the proposal author) and create a written summary with a score or ranking that reflects their converged rating (for simplicity, we will use the NSF rating scheme: Excellent, Very Good, Good, Fair, Poor). These reviews should be professional, critical and respectful. Important factors may include, but not be limited to: (i) significance; (ii) innovation; (iii) originality; (iv) technological impact; (v) societal impact, if relevant. Each student will be provided with the individual reviews for their proposal as well as the summary review and rating, then meet with their peer review team for direct feedback.

1 The actual translation is “I only made this one longer because I didn’t have time to make it shorter,” but “this” and “it” are only understood within the context of the entire letter.
**Academic Integrity.** You should be aware of this already, but it is always important to remind yourself of ethics and integrity in all aspects of your career. More specific to the current stage of your career, students who fail to conform to NYU’s standards on academic integrity including cheating and plagiarism are subject to disciplinary action. “Essential to the process of teaching and learning is the periodic assessment of students’ academic progress through measures such as papers, examinations, presentations, and other projects. Academic dishonesty compromises the validity of these assessments as well as the relationship of trust within the community.” - read the web link for additional details: https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/academic-integrity-for-students-at-nyu.html

**Course Schedule** (subject to minor adjustments in the event of unanticipated events)

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<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic or Activity</th>
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<tbody>
<tr>
<td>1</td>
<td>Sept 7</td>
<td>Lecture 1 (in class): Course objectives and structure. Why are proposal writing skills important? Who is your audience now? Who will be your audience in the future? Funding agencies, proposal expectations, and format (NIH and NSF) Your ORP: Format and creating an original idea</td>
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<tr>
<td>2</td>
<td>Sept 14</td>
<td><strong>One-page summary of PhD thesis project due by 08:00 am</strong> Lecture 2 (in class): Technical aspects of proposal writing. Jargon vs simplicity. Knowing your audience. Peer review: Roles and responsibilities. Peer review team assignments</td>
</tr>
<tr>
<td>3</td>
<td>Sept 21</td>
<td>Panel I: Creating research proposals in academia (in class) Panelists: Prof. Glen Hocky; Prof. Marvin Parasram; Prof. Marcus Weck</td>
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<td>4</td>
<td>Sept 28</td>
<td>Peer review teams meet (in class)</td>
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<td>5</td>
<td>Oct 5</td>
<td>Peer review teams meet (in class)</td>
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<td>6</td>
<td>Oct 12</td>
<td>Preliminary proposal due 08:00 am Discussion about challenges in this assignment (in class)</td>
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<tr>
<td>7</td>
<td>Oct 19</td>
<td>Written peer reviews of preliminary proposal due 08:00 am Peer feedback session (in class)</td>
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<td>8</td>
<td>Oct 26*</td>
<td>Meditation week. Work on your own.</td>
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<tr>
<td>9</td>
<td>Nov 2</td>
<td>Peer review teams meet (in class)</td>
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<td>10</td>
<td>Nov 9</td>
<td>Open Forum and one-day team shuffle</td>
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<tr>
<td>11</td>
<td>Nov 16</td>
<td>Peer review teams meet (in class)</td>
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<tr>
<td><strong>Monday</strong></td>
<td><strong>Nov 21</strong></td>
<td>ORP due 08:00 am</td>
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<td>12</td>
<td>Nov 23</td>
<td>Wednesday before Thanksgiving (no class)</td>
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<tr>
<td>13</td>
<td>Nov 30</td>
<td>ORP Peer Reviews due 08:00 am Panel II: Pitching your ideas in industry settings and startups (in class) Panelists: Prof. Jin Montclare (NYU); Dr. Laura Philips (Spheryx, Inc.); Dr. Timothy Rhodes (Merck &amp; Co., Inc.)</td>
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<tr>
<td>14</td>
<td>Dec 7</td>
<td>ORP Merged Panel Review due 08:00 am Short talks (Red Team, Blue Team)</td>
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<tr>
<td>15</td>
<td>Dec 14</td>
<td>Short talks (Green Team, Purple Team)</td>
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*MDW out of town

**orp Exam scheduling and mechanics.** See the department guidelines on the following page.
Department of Chemistry guidelines for the Original Research Proposal

Excerpted (with some minor edits) from the document provided in advance of the recent Department Graduate Program Town Hall, June 14, 2021

- Enroll in the 1-credit Original Research Proposal class (fall semester Year 3)
- Standalone Original Proposal Exam in January or February of Year 3.
- Current students in year 4 and beyond can audit this class if they would like to satisfy the new Ph.D. requirements and take the exam in spring following completion of the course.

Original Research Proposal Exam

Students are required to present an original research proposal to their Core Dissertation Committee during the third year in residence in the form of a written report and an oral presentation. An original proposal provides an opportunity for the student to demonstrate proficiency in the design, planning and communication of an original research problem.

Each student is required to propose a research plan, with experimental details, that addresses (i) a specific problem or system or (ii) the use of an existing technique or methodology applied to a specific problem or application. The proposal must be original, meaning that there should not overlap with the student’s dissertation topic and should not exist in the scientific literature, patent literature, or other sources.

The student is required to arrange the date and time for the examination with the members of their Core Dissertation Committee by December 1 and to inform the Department Graduate Office of the date and time. The exam should be held in January or February of the student’s third year in residence. The original research proposal examination consists of both written and oral components.

The written component of the exam must be submitted to the Dissertation Committee members prior to the end of December of the student’s third year in residence, and at least two weeks prior to the scheduled exam date. The written document should be single-spaced and no more than five (5) pages in length. The written proposal should identify a research topic in chemistry not related to the student's dissertation research, explain its importance and broader context, describe a project and how it falls within the scope of the topic, describe how the project would be performed and how its feasibility would be demonstrated, and describe the overall aims of the project and the results anticipated upon its completion. Experimental proposals should include details of the experiments needed for project completion, whereas theoretical proposals should describe specific calculations, methodologies and theoretical frameworks.

The oral portion of the exam consists of a 15-minute, uninterrupted presentation by the student to their Core Dissertation Committee, during which the student summarizes the written proposal. This is followed by a question-and-answer session that lasts no longer than 45 additional minutes. The total meeting time should not exceed one (1) hour.

Following committee questions during the oral presentation, the student leaves the room and the committee discusses whether the student will “Pass” or “Fail” the exam. The committee’s decision will be based on the originality of the idea and the clarity of its presentation. In the event of a Fail verdict, the student will need to retake the exam prior to the end of year 3.