

## Class Presentations-Chemistry 414

rev. 1/1/08

As part of becoming a professional chemist, it is important to develop your skills of devising, researching, evaluating, and presenting proposals for new research. These assignments are intended to help you to exercise these skills this in a team format. These are way more creative and fun than problem sets!

In Chem 414, you will do two presentations to the class, as part of a two-person team. For the first, you will choose a specific topic within chapter 7 of the book; for the second, you will choose a specific topic within the boundaries of one chapter of the book (selected from Chapters 9,12,13,14). Your specific topic will be built around an idea for future research that could be carried out to answer a significant question.

- The purpose of teams is so that you can bounce ideas off one another, and critique each other's ideas. I will also be happy to discuss your ideas (or watch a "rough draft" of your presentation, as long as you give me sufficient warning so that we may schedule a meeting.
- You should use video projection or overhead transparencies.
- The idea behind your proposal must be your own (and not your research advisor's or another group member's) and must be significantly different from your Ph.D. project, as judged by the instructor.
- You should include some audience participation: asking them a question, giving them a question to think about, or otherwise encouraging audience engagement in an overt way.

**Jan 25th:** I will give some topics to the class for potential presentations. There will be one list for the Ch. 7 presentations, and another for the April presentations.

**Feb 1st:** You will email Pat two lists of your top 3 choices of topics. Based on these, I will assign 2-person teams the broad subject of their proposal topic, and assign times. You may trade your chapter or time with another team if you wish. You need to plan ahead to (1) narrow your topic, (2) evaluate possible proposals, (3) think of pitfalls in the proposals, and (4) select one for detailed elaboration.

**Feb 15th:** On or before this date, your first team will submit a written 1-paragraph abstract that briefly outlines the topic and idea. I strongly encourage you to discuss ideas with me before and after this date, so that I can point you in the right direction, and encourage the right amount of coverage. Your final topic and scope of coverage must be approved 1 week before your presentation.

**Feb 25-29: First proposal presentations.** The presentation is 10-15 minutes, followed by questions. Look carefully at the grading criteria below to see what is most important in your presentation. This will count 15% of your final grade.

**Mar 21st:** On or before this date, your second team will submit a written 1-paragraph abstract that briefly outlines the topic and idea. I strongly encourage you to discuss ideas with me before and after this date, so that I can point you in the right direction, and encourage the right amount of coverage. Your final topic and scope of coverage must be approved 1 week before your presentation.

**Apr. 4 – May 2: Second proposal presentations.** One presentation each Wednesday, on the chapter under discussion that week. The presentation is 15-20 minutes (NOT over 20 minutes), followed by questions. Look carefully at the grading criteria below to see what is most important in your presentation. This will count 25% of your final grade.

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## **Grading**

The criteria that will be used for grading your presentation follow:

- \* **Topic:** Is the topic clearly defined, and is the significance delineated? Is it bioinorganic chemistry?
- \* **Your question for future research:** Is this a novel question, or a creative approach to a problem? Would the answer be significant?
- \* **Method:** Is it feasible to learn the answer to the future research question in the way proposed?
- \* **Background:** Is the question put into context with appropriate literature references (cited correctly)? Is the background material correct?
- \* **Fundamentals of Inorganic Chemistry:** Does one part of the presentation overtly use the "fundamentals" of inorganic chemistry (topics covered in the first lecture and Tutorial II)?
- \* **Fundamentals of Biochemistry:** Does one part of the presentation overtly use the "fundamentals" of biochemistry (topics covered in the Tutorial I or Problem Set 2)?
- \* **Class participation:** Does some part of the presentation involve audience participation?
- \* **Visuals and presentation:** Is the presentation coherent and understandable, with appealing and clear figures that help the audience follow the talk?
- \* **Handling questions:** Are questions from the audience (and Prof. Holland) answered knowledgeably?

## **Structure of Presentation**

- \* **Introduction:** Describe the motivation for your work.
- \* **Background:** Teach the class something that will be interesting to them, and also highlight the reasons why your proposed research question is important. Keep it brief, and focused on your proposal topic!
- \* **Statement of Question and Hypothesis:** Narrow this to a question that could be answered on the scale of 1-3 Ph.D. theses. In your hypothesis, think from a "class basics" perspective.
- \* **Method:** What techniques would you use to address the question? What experiments would be done?
- \* **Pitfalls:** Anticipate at least one potential problem and say what you would do. Others may come up in the question & answer section after your talk.
- \* Both members of the team should do roughly equal amounts of the presentation.

## **Topics**

Some examples of appropriate research questions:

- Elucidation of the reaction mechanism of a redox metalloenzyme.
- Characterization of structure, metal environment, or function of a recently discovered metalloenzyme.
- Investigation of novel metal or metal complex interactions with biomolecules (DNA, proteins, carbohydrates, membranes).
- Inorganic probes of biomolecule structure and reactivity.
- Study of synthetic complexes to mimic structure, spectroscopy, and reactivity of metalloproteins.
- Mechanism of ribozyme catalysis (if the role of metal cofactors is central to the proposal).
- Engineering of a metalloprotein to tune or alter function (for example, design an industrially useful protein-based catalyst).
- Gene regulation by metals and metalloproteins.
- Metalloneurochemistry - what roles do transition metals play in the brain?
- Development of metal-based imaging agents for medicine (MRI contrast agents or radiopharmaceuticals) or therapeutic radiopharmaceuticals.
- Development of inhibitors of a medically relevant metalloenzyme.
- De novo designed peptides for exploring metal coordination chemistry.

Proposing to determine a crystal structure relies heavily on the ability to grow crystals, and will not provide you with the opportunity to evaluate a variety of approaches. Other methods of probing structure (spectroscopy, inorganic probes), however, are appropriate.