Appendix 2

CH390 Term Research Topics Winter 2014

There are four major term projects in CH390: an annotated bibliography, a review-style term paper, a poster and an oral presentation. You will focus all four of your term projects on a single topic. The United Nations has declared 2014 as the International Year of Crystallography (http://www.iycr2014.org/), and so your research topic will focus on some aspect of crystallography.

By Friday, January 10, you must e-mail your course instructor (ldawe@wlu.ca) with your top three selections from the following list. Also, include in your e-mail a short description of what you like in chemistry (ex. “I like math and physics” or “I like proteins” or “I like pharmaceutical drug design”) so that I can ensure that even if you do not get your #1 pick, that you do get a subject related to your interests.

Note that many of these topics are very broad. You must focus your term research on the crystallographic aspects (for example, the role of X-ray crystallography in the determination of the structure and function of the ribosome.)

1. History of Small Molecule Crystallography in Canada;
2. History of Protein/Macromolecular Crystallography in Canada;
3. Multiscale models for complex chemical systems (2013 Nobel Prize – Chemistry);
4. G-protein-coupled receptors (2012 Nobel Prize – Chemistry);
5. Quasicrystals (2011 Nobel Prize – Chemistry);
6. Two-dimensional material graphene (2010 Nobel Prize – Physics);
7. Structure and function of the ribosome (2009 Nobel Prize – Chemistry);
8. Molecular basis of eukaryotic transcription (2006 Nobel Prize – Chemistry);
9. The fullerene form of carbon (1996 Nobel Prize – Chemistry);
10. Neutron Diffraction (1994 Nobel Prize – Physics);
11. Direct methods for the determination of crystal structures (1985 Nobel Prize – Chemistry);
12. Nanocrystals as Clathrates;
13. Crystals that exhibit large negative linear compressibility;
14. Highly Porous Materials for Clean Energy Applications;
15. Small Angle X-ray Scattering of Polymers;
16. Small Angle X-ray Scattering of Biological Macromolecules;
17. Endohedral Fullerenes;
18. Biomineralization;
19. Strong and Weak Hydrogen Bonding;
20. Computational and Crystallographic Studies of Transition Metal-Main Group Multiple Bonding;
21. Time-Resolved Biochemical Crystallography;
22. Pharmaceutical Polymorphism;
23. Developments in Inorganic Crystal Engineering;
24. High Pressure Crystallography;
25. Structure determination of molecular solids from powder X-ray diffraction data;
26. Magnetic Structure Determination;
27. Applications of the Cambridge Structural Database in Chemical Education;
28. Halogen bonding in supramolecular chemistry;
29. Phase Transitions in Inorganic Materials;
30. Innovations in Crystal Growing Techniques;
31. Dorothy Hodgkin;
32. Rosalind Franklin;
33. John Kendrew and Max Perutz;
34. Geoffrey Chang;
35. Synchrotron radiation sources – Diamond, CERN, Canadian Light Source and others;
36. Anomalous diffraction and the phase problem;
37. A topic of your own interest/suggestion;