

Statement of Teaching Philosophy

Paris W. Barnes

Materials Science Division, Argonne National Laboratory

Previous Teaching Responsibilities

- August 1994 – May 1998: **Undergraduate chemistry tutor** for the Morehead State University Chapter of the American Chemical Society.
- September 1998 – December 2000: **Graduate Teaching Assistant (GTA) in general chemistry courses** (CHEM 101, 121, and 123) at The Ohio State University.
- January 2001 – June 2003: **GTA in honors general chemistry courses** (CHEM H201, H202, and H203) at The Ohio State University. Honors GTA positions are reserved for graduate students that have exhibited outstanding skills while teaching general courses. In addition to the responsibilities of a general chemistry TA (leading recitations and laboratories, holding office hours), I would regularly conduct study groups in order to help students prepare for upcoming examinations. I also offered opportunities to schedule appointments with me to discuss their in-class performance, study skills, and to address questions concerning course materials.
- August 2004 and August 2005: **Lecturer and Instructor for the neutron powder diffraction workshop** during the National Neutron and X-ray School (NXRS) at Argonne National Laboratory. The NXRS is an annual event where graduate students from various universities learn about X-ray and neutron scattering through lectures, hands-on experiments, and data analysis. My NXRS responsibilities included presenting a brief overview of magnetic scattering (August 2004), lecturing on Rietveld structural analysis and introducing the experiments the students completed during the workshop (August 2005), and directing the graduate students through the analysis of neutron powder diffraction data collected on known materials (both years).

Teaching Philosophy and Methods

Teaching is a vital part of any academic career. The responsibility of developing the minds of future doctors, scientists, business leaders, etc. is a great one. I believe that students want professors who are clear, concise communicators that proactively teach so they can succeed at the university level. Additionally, I feel that professors should approach teaching as an interesting and challenging activity in order to be innovative and effective in the classroom. This has always been my motivation for teaching, whether I was a teaching assistant for undergraduate students or an instructor at a workshop for graduate students and peers.

My goal as a teacher is to effectively communicate the subject matter in an interesting way to the students in order to create an atmosphere conducive to learning. I believe that learning is a difficult task and students who are willing to put forth the effort to learn the material will do so. The way a professor approaches his or her teaching responsibilities will have a profound impact upon the learning process. If a teacher makes the material covered in a course interesting, their students are more likely to retain the information presented. As an assistant professor, I would use a number of methods to clearly convey principles relevant to the chemistry classes I would teach:

- **Demonstration-Supplemented Lectures** – One of the most effective ways to capture a student’s attention during scientific lectures is through hands-on demonstrations. Such displays are most effective when they are exciting while clearly conveying an important chemical principle at the same time. I have seen this technique used by chemistry professors at Ohio State and without a doubt, well-chosen demonstrations liven up the lecture and prompt discussions about their chemical bases.
- **In-Class Participation** – In the classes I teach, lectures will be driven by student-teacher interactions. First, students will be encouraged to ask questions during lectures in order to help them understand the presented material better. Second, in larger classes (forty students or more), students will be organized into small groups for the duration of the course. Throughout the academic term, I will ask the class a thought-provoking question every time we meet. Then, at random, I will ask one of the groups to give their answer to the class. This activity should encourage group discussion of the topic in question.
- **Development of Internet Resources** – Many courses have developed websites where notes, mock examinations and quizzes, class discussion boards, and relevant supplemental materials are posted for the student’s use. I believe that internet resources are an excellent way to continue teaching outside of the classroom. As a GTA, I created websites for the different courses I taught that contained information regarding laboratory exercises and recitation sessions. Regularly, I would post written answers to difficult questions from exams and homework on these webpages. Examples of previously developed internet resources can be found at <http://www.chemistry.ohio-state.edu/~pbarnes/classes/>. Since many universities currently have e-learning resources available for teachers, I would focus on developing relevant information such as those items listed above to post on the website.
- **Research Papers** – Students in classes with smaller enrollments will be required to write a research paper. This paper will focus on a topic related to the material covered in the course that interests the student. The students will be required to research the topic beyond the depth it was discussed in class.

In addition, through feedback from students and peers, I will continually strive to improve my teaching abilities. Adjustments in style and resources will constantly be made in order to achieve the objective set forth earlier.

Teaching Interests

Since my formal training is in inorganic solid-state chemistry, I am confident that I could successfully teach the following courses:

- All General Chemistry Classes (Chemistry for Non-science Majors, Chemistry for Science Majors, Honor’s General Chemistry)
- Inorganic Chemistry I (Descriptive Inorganic Chemistry)
- Inorganic Chemistry II (Atomic Structure, Bonding, Group Theory, Organometallic Chemistry, Basic Solid-State Chemistry, Spectroscopic Techniques)
- Inorganic Chemistry Laboratories
- Solid-State Chemistry (Advanced course)
- Undergraduate Research