

**Department of Chemistry, College of Letters and Science
University of Wisconsin, Madison**

Plan for Assessing the Ph. D. in Chemistry

May, 2006

Introduction

The Chemistry Graduate Program is consistently ranked in the top 10 nationally. There are 270 graduate students in our program, and the department graduates about 30 Ph.D.'s and 15 M.S. students a year. Our graduates find employment (typically after postdoctoral research) in chemical industry, at research universities, at liberal arts colleges, and in diverse other areas. The Chemistry Department offers a Ph.D., a M.S. degree based on research, and a M.S. degree based on course work alone.

Since all incoming graduate students are recruited and admitted into the Ph. D. program, our focus in this assessment exercise is on the Ph.D. program. In 2002, we decided to participate in the Carnegie Initiative on the Doctorate project, with the goal of making our already-world-class graduate program even better.

Any successful assessment plan for graduate education in chemistry has to be tied directly to curricular reform. Monitoring the graduate program should lead to updating it and to introduction of fundamental changes into the curriculum. For the past several years, we have been doing just that. Our new plan for assessment will be also be directly aimed at curricular improvements in response to what we learn. The department's efforts at assessment and reform were aided by participation in the Carnegie Initiative on the Doctorate.

Goals of our Doctoral Program in Chemistry

At the start of our Carnegie Initiative on the Doctorate discussions, we asked: "What Characteristics do we want our PhD in chemistry graduates to have?" We came up with the following list:

- Expertise in a domain
- Breadth of scientific knowledge
- Ability to solve problems
- Find and define new problems
- Oral, visual, and written communication skills
- Teamwork skills
- Confidence and independence
- Expert learner
- Creativity

Our assessment plan and our curricular reform plans are directed at achieving this outcome.

Recent Assessments of the Graduate Curriculum in Chemistry include:

- (1) A 1998 survey of current and former graduate students.
- (2) A 2002 Chemistry Department Self Study and External Review.
- (3) A 2004 survey in conjunction with the Carnegie Initiative on the Doctorate that solicited faculty and graduate student opinions on the doctoral program.
- (4) A 2005 UW graduate student initiated survey of graduate student satisfaction with our PhD program and with the departmental climate.
- (5) Chair Jim Skinner's 2005 listening sessions and department colloquium.

Recent Responses to Information from Assessments

Our 1998 graduate student and PhD Alumni survey showed less than 75% satisfaction from current and former graduate students in several areas:

- (1) Opportunities to develop writing skills.

Responses: A 2006 colloquium on communicating in the sciences. Similar future events will be scheduled.

Monthly information emails from the UW Writing Center forwarded to graduate student by our graduate admissions and placement director.

- (2) Quality Feedback on Public Presentations by Graduate students.

Responses: All department divisions now give written and verbal comments/criticism for the second year reports, thesis background exams, and research proposals.

- (3) Information about Department Requirements

Responses: The department adopted new unified graduate requirements for the PhD in chemistry in 2005.

The new department website has clearly laid out these requirements and is accessible to graduate students, faculty, and incoming students.

- (4) Level of Financial Support

Response: Chemistry graduate students receive supplements to the inadequate 50% university stipends for TA and RA positions to improve our competitiveness with graduate chemistry programs nationally.

- (5) Opportunities for scientific contacts outside the department

Response: A group of graduate students now takes each seminar speaker to lunch for informal discussions. Graduate students can now nominate speakers for the colloquium series. The McElvain Lecture Series provides the opportunity for graduate students in each division to invite one academic and one industrial speaker each year; the students

host and meet with the speakers. Divisions make an effort to invite industrial speakers and set aside time for informal discussion.

(6) Information about Diverse Career Paths

Response: This is an area that needs improvement. In 2005, the UW chemistry department held the inaugural American Chemical Society workshop on “Preparation for Life After Graduate School”. About 25 graduate students participated in this two-day PFLAGGS workshop that provided information on the breadth of career opportunities and how to apply for them. We plan to ask ACS to hold another PFLAGGS workshop. Seminars from women chemists are now coupled with meetings with graduate students on women’s issues in the workplace.

Summary of Major Changes in Graduate Curriculum and Graduate Student Life

(1) 2005: Uniform Graduate Student Requirements passed by department .

(2) 2004: New one credit course for new graduate students: panel discussions on picking research groups, how to be an effective teaching assistant, teaching assistant experiences, applying for jobs at 4 year colleges, scientific writing and oral presentations.

(3) 2005: Efforts to improve diversity in the department include the establishment of a diversity committee. This committee has proposed a Policy to Ensure a Safe Pregnancy and a Childbirth Accommodation Policy to support women who chose to combine family initiation with their chemical education. In an effort to recruit more minorities to our graduate program we sent a faculty and student representative to the 2006 National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE).

(4) 2005: Efforts at community building in the department include: changes in the Snout-Out (our annual picnic); initiation of receptions following Friday department colloquia; expansion of committees to include graduate students and academic and clerical staff; a new graduate student organized pan-divisional poster session.

Future Plans for Assessment

(1) Monitoring national reports of our effectiveness

2006 US News and World Report ranks UW chemistry in the top 7 in *all* areas of chemistry.

Chemical and Engineering News cited the UW Chemistry Department as 6th in the number of PhDs on the faculty at the top 50 research universities in the US.

(2) 2007 Survey of Graduate Students and PhD alumni.

We plan to follow up on our 1998 surveys of current graduate students and alumni graduate students to achieve a longitudinal study of the effectiveness of our graduate program. In addition to using all the same questions as on our 1998 survey, we will add new questions about the departmental climate and we will ask for suggestions for improvement. We plan to use an electronic survey in Fall 2007 (10 years after our previous survey). Those surveyed and analyzed separately will include the same entering classes of 1988, 1989, 1990 which were queried in 1998 (to see if their perceptions have changed); recent graduates (2-5 years after PhD, classes entering in 1998, 1999, and 2000); and current graduate students.

(3) Input from Industrial Recruiters of our PhD Graduates

We will solicit comments from industrial recruiters on the quality of our graduates and their preparedness for employment in chemical research laboratories. We will compile data on where our graduates are initially employed (postdoc, industry, etc) and where they eventually obtain permanent employment.

(4) Data on retention rates in the PhD program and on time to degree

Trends in the number of entering graduate students who receive a Wisconsin PhD will be compiled. We will look for trends and for gender differences. Trends in the time for degree will also be gathered.