

# Student Learning Outcomes Assessment Summary

## ***Environmental Chemistry, Ph.D.***

*College of Natural Sciences and Mathematics*

**Summer 2016 – Spring 2018**

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### **1. Assessment information collected**

We assess students at all committee meetings and defenses on a 9-point rubric. Students are assessed with respect to specific criteria and graded as deficient compared to expectations (-1), meeting expectations (0), or exceeding expectations (+1). There were fourteen (14) anonymous forms collected in this period, and the average of all assessments is presented in the table below.

Assessment criterion	Result
1. Specific knowledge of literature	+21%
2. Ability to critically analyze literature	+14%
3. Technical abilities	+43%
4. Quantitative abilities	+29%
5. General knowledge of field	+21%
6. Presentation skills	+36%
7. Writing Skills	+29%
8. Ability to formulate hypotheses and articulate methods for testing hypotheses	+7%
9. Ability to act as an independent researcher	+36%

The results show that the faculty feel that students are doing better than expected with respect to these criteria. Particularly high marks were given to “technical abilities”, “presentation skills”, “independence”, “quantitative abilities” and “writing skills”. The lowest score is on hypothesis development and testing, which is reasonable given that we had a lot of early-stage students in the program during most of this period.

Two Ph.D. students graduated in this period and both found employment in field. One of these students published one paper and has two manuscripts in preparation, while the other student has two published papers and one more manuscript in preparation.

These two Ph.D. students graduated in 2016, early in this review period, and for most of the review period, the program had six (6) mostly early-stage students. Of these six students, four passed both written and oral comprehensive examinations and two are currently part way through their written comprehensive examinations, needing to hand

in their written dissertation proposal. One student joined in Spring 2018 and has not yet begun taking comprehensive examinations. Overall, all students who have completed testing have passed their comprehensive examinations.

Students were active in presentations and grants, with totals for the period Summer 2016 – Spring 2018 as listed below. Because there were six students in the program for much of this period, we can also convert these to approximate numbers per student over the two-year review period.

- Oral presentations = 18 (about 3 per student)
- Poster presentations = 14 (about 2 per student)
- Grants applied for = 20 (about 3 per student)
- Grants received = 13 (about 2 per student)

## **2. Conclusions drawn from the information summarized above**

Our SLOA plan has four intended outcomes, which are discussed below:

**a) Technical abilities:** Students did very well on this area in our student assessment survey. Annual progress reports showed students had good progress and most students are working towards a publication.

**b) Independence:** Students scored above target for expectations of being an independent researcher and developing hypotheses. All students who faced their oral comprehensive examinations passed on the first time, and written dissertation proposals were well developed. Many students applied for student-led grants (20 applied for) and a high percentage of these grants were funded (13 were funded), again demonstrating student skill in developing projects. All graduated students have published at least one peer-reviewed paper at graduation and have published more work and/or have publications in preparation.

**c) Communication skills:** Students have been highly active in presenting their work both as oral and poster presentations. A number of these presentations received competitive awards. All students who faced their written and oral comprehensive examinations passed them, demonstrating skill at communication of their ideas.

**d) Employment:** All students who graduated in this period are employed in this field.

## **3. Curricular changes resulting from conclusions drawn above**

During our SLOA committee meeting, we discussed these results and were generally happy with how students performed. Therefore, we did not suggest any curricular changes. As a separate action by the department, the graduate seminar class was canceled. This action affected our program because graduate students were required to take one semester of Graduate Seminar (Chem F692) and one semester of Research

Presentation Techniques (Chem F691). The SLOA committee felt that having two oral presentation skills classes was important to our current success with students, so we modified the Research Presentation Techniques (Chem F691) class to be repeatable for credit and now require students to take this one-credit class twice. The first time a student takes this class, they present their research topic and basic literature related to it, but do not defend this presentation. The second time, they present their dissertation proposal and defend this proposal in a "mock orals". We feel that this adjustment made in response to the departmental offering change should maintain the current success in oral presentation skills, but will watch this topic in the next review period in case we need to make an adjustment.

**4. Identify the faculty members involved in reaching the conclusions drawn above and agreeing upon the curricular changes resulting**

The following faculty members are on the SLOA committee:

- Bill Simpson
- Jennifer Guerard
- Tom Trainor
- Jingqiu Mao
- Tom Green
- Sarah Hayes (a former faculty member) provided some data.

The committee met on 9 May 2018 at 1PM and continued discussions via email in revising this report.

**5. Has your SLOA plan been updated to include assessment of the program's Communication Plan, as required by Faculty Senate motion? (required for baccalaureate programs only)**

This is a graduate program, which has never relied on W and O offerings, so the Faculty Senate motion regarding communications plans does not apply. However, we took the opportunity to review our SLOA plan and have prepared a revised SLOA plan, which we intend to submit this summer.