Student Learning Outcomes Assessment Summary

Environmental Chemistry, Ph.D.

CNSM

2014-15 and 2015-16

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1. Assessment information collected

At all student meetings (annual committee meetings, comprehensive exams, etc.), we assess how students are progressing through their degree program on a 9-point rubric. Students are assessed with respect to expectations for a student in their year in program as deficient (-1), on-track (0), and exceeding (+1) expectation. There were fourteen (14) total anonymous collected assessments in this period. The results are calculated as the average of all assessment responses and are shown in the table below.

Assessment criterion	Result
1. Specific knowledge of literature	+0%
2. Ability to critically analyze literature	+0%
3. Technical abilities	+21%
4. Quantitative abilities	+0%
5. General knowledge of field	+7%
6. Presentation skills	+21%
7. Writing Skills	+0%
8. Ability to formulate hypotheses and articulate methods for testing hypotheses	+0%
9. Ability to act as an independent researcher	+7%

The results show that students were "on-track" for the majority of categories and exceeded expectations significantly in "Technical abilities" and "Presentation skills" and exceeded expectation more moderately in "Knowledge of field" and "Ability to act independently".

Faculty reviewed written comprehensive examination reports and found students have appropriate breadth of coverage in the field of Environmental Chemistry and sufficient depth in their research topical area. Our comprehensive examination procedure requires three topical written exams plus a fourth written "dissertation proposal". We have allowed a flexible format for the dissertation proposal and to encourage students to submit proposals for funding allowed students to write this proposal in any format of a research grant. A number of students have taken advantage of this flexibility and have

submitted these proposals for external support, which was viewed positively. However, in some cases, we found that the format selected did not have sufficient space (pages) for a dissertation-wide scope.

Faculty reviewed presentation skills were assessed in the Research Presentation Skills (Chem F691) class and found to be consistent with professional standards. All graduate students were required to present at the Environmental Chemistry Symposium (April 24, 2015 and April 22, 2016) (http://www.uaf.edu/chem/echemsymposium/) and all presentations were viewed as of high quality. Environmental Chemistry Ph.D. student Amanda Barker was given the "Best Graduate Oral Presentation" award in 2015, and Ph.D. student Niki Jacobs was given the "Best Questions" awards in 2016.

In this two-year period (Summer 2014 – Spring 2016), two Ph.D. students graduated and both went on to postdoctoral associate positions in their respective fields. As of May 2016, one student had two chapters of the dissertation published and one more prepared for submission, and the other student had four dissertation chapters prepared for submission. The published chapters are in the public domain and are:

Peterson, P. K., W. R. Simpson, and S. V. Nghiem (2016), Variability of bromine monoxide at Barrow, Alaska, over four halogen activation (March–May) seasons and at two on-ice locations, J. Geophys. Res. Atmos., 121, 1381–1396, doi:10.1002/2015JD024094.

Peterson, P. K., Simpson, W. R., Pratt, K. A., Shepson, P. B., Frieß, U., Zielcke, J., Platt, U., Walsh, S. J., and Nghiem, S. V.: Dependence of the vertical distribution of bromine monoxide in the lower troposphere on meteorological factors such as wind speed and stability, Atmos. Chem. Phys., 15, 2119-2137, doi:10.5194/acp-15-2119-2015, 2015.

Five other chapters in the two Ph.D. theses in this period were prepared for submission, but not yet submitted at the time of this report.

2. Conclusions drawn from the information summarized above

We concluded that the program was succeeding in achieving student learning outcomes goals. Students were significantly exceeding expectations for technical abilities and presentation skills, and showed no deficiencies overall. Students have all been employed as postdoctoral associates in their field of training, and manuscripts have been prepared and accepted for publication.

We found that the guidance given to students for the dissertation proposal was not always achieving the desired outcome and will seek to improve this guidance.

3. Curricular changes resulting from conclusions drawn above

No major curricular changes were indicated by the results of this process. However, we are considering ways to improve the fourth written comprehensive examination, the

"dissertation proposal". The current discussion are building upon the guidance given to Geosciences students on the link below:

http://www.uaf.edu/files/geology/solid_earth_comps.pdf

The program will continue this discussion and revise the comprehensive examination guidance given on our website:

http://chem.uaf.edu/comps/EChemCompsPlanApr2014.pdf

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

This was discussed at a meeting on 13 May 2016 attended by: William Simpson, Tom Green, Tom Kuhn, William Howard. The draft report was circulated to William Simpson, Tom Green, Tom Trainor, Cathy Cahill, Sarah Hayes, and Jennifer Guerard, who provided more input.