The Department of Chemistry and Biochemistry
Assessment Report – PhD Programs- Academic Year 2016/2017

**MSU’s Mission**
Montana State University, the state’s land grant institution, educates students, creates knowledge and art, and serves communities by integrating learning, discovery and engagement.

**The Department of Chemistry and Biochemistry Mission**
The mission of the Department of Chemistry and Biochemistry is to provide students with educational experiences that empower and guide them to think critically and creatively for long term professional success in their chosen fields.

The following assessment report highlights the Department of Chemistry and Biochemistry’s Ph.D. programs in chemistry and biochemistry based on data from Fall of 2015 through Spring of 2017. The report begins with facts about the program in the last ~2 years and then presents information on the Department’s and the Graduate School’s requirements. Data on Ph.D. learning outcomes are also presented.

**Facts about the Program**

- 67 graduate students were enrolled in the Fall of 2015.
- 67 graduate students were enrolled in the Fall of 2016.
- 2 Ph.D. students were accepted in the Spring of 2017 (not included in table below)
- 15 new graduate students will be attending MSU in the Fall of 2017 (not included in table below).

Table 1 below provides the number of graduate students in the program based on their entering class year. Of the current total (67) in the Fall of 2016, 4 students were on either a thesis or coursework (CW) Master (MS) track. All other students are pursuing a Ph.D. in chemistry or biochemistry.

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<tr>
<td></td>
<td>12</td>
<td>11</td>
<td>11</td>
<td>10</td>
<td>10</td>
<td>7</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

- Of the last 2 entering classes (2015 and 2016), only one Ph.D. student who entered in 2015, transferred to a different university with a professor who left the department.
- Two other students left in the summer of 2015. One student on the MS track failed to obtain their degree and one PhD student left because she was not in good standing.
- A Ph.D. student who entered in 2010 left the program in the Fall of 2016 without a degree.

The next section of the documents provides information on both department and The Graduate School Requirements.
1. **Qualifying Exams**

All first year students take qualifying exams (proficiencies) to demonstrate their preparedness for an advanced degree in our program. The exams are a department requirement. Students are required to pass 3 proficiency exams in their first year of graduate school to remain in good standing. The exams are offered 4 times a year and except for the structural and molecular biology exam, all exams are standardized American Chemistry Society (ACS) exams given in 5 different sub-disciplines. The outcome for any exam can be a Full Pass (FP) Master Pass (MP) or a No Pass (NP). As determined by the well-publicized ACS norms, a FP is set at the 55th percentile, the MP is set at ~ 50th percentile and scores below the 50th percentile are considered a NP. The names and results of each student who took proficiencies in the entering classes of 2015, and 2016 appear in Appendix A (data not shown).

Results:

**Entering Class of 2015** – Of the 9 students taking the proficiency exams, all student have the met the department requirement of passing 3 exams.

**Entering Class of 2016** - Of the 12 students taking the proficiency exams, all of them have passed the proficiency requirement.

2. **Comprehensive Exams**

The Graduate School requires a comprehensive exam after 2/3 of a student’s coursework has been completed. Typically our department has students defend written and oral portions of the exam (at the same time) during the student’s second semester of their second year of graduate school. See Appendix B (data not shown) for names of those students who defended the exams in AY 2015/2016, and AY 2016/2017. A summary of the results are below.

Eleven students that were in good standing from the class of 2014 successfully defended their written and oral comprehensive exams in either spring of 2016 or the fall of 2016. One student in the class of 2014 changed from a Ph.D. track to an MS after she defended her comprehensive exam. Of the entering class of 2015, 8 students successfully defended their comprehensive exams in the spring of 2017. One student transferred to a different program and one student switched to an MS coursework option and did not take the comprehensive exam.

3. **Department Requirement- 4th year seminar**

The Department of Chemistry and Biochemistry requires that all students in their 3rd or 4th year of graduate school give a public research seminar. The students meet with their Ph.D. committees after their seminar to discuss relevant research questions and to obtain feedback from their committee on progress to date and time of expected graduation. It is assumed that the student will graduate with their degree ~ 1-2 years after they give their seminar.

**Completed seminar in year 2015**
7 students completed this requirement.
4. Graduation

Table 2 summarizes our graduation statistics for the last 8 years. Figure 1 (conclusion section) depicts a longitudinal overview of degrees awarded since 1999. The names of students who graduated in the 2015, 2016 and currently in 2017 appear in Appendix C (data not shown).

Table 2 Graduation Statistics

<table>
<thead>
<tr>
<th>Year</th>
<th>Degree</th>
<th>N</th>
<th>Average Credits</th>
<th>Average GPA</th>
<th>Average #yrs to graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009 (Jan-Dec)</td>
<td>MS</td>
<td>4</td>
<td>42.5</td>
<td>3.51</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>PhD</td>
<td>7</td>
<td>76.3</td>
<td>3.7</td>
<td>5.7</td>
</tr>
<tr>
<td>2010</td>
<td>MS</td>
<td>3</td>
<td>38</td>
<td>3.67</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PhD</td>
<td>8</td>
<td>80.5</td>
<td>3.75</td>
<td>5.4</td>
</tr>
<tr>
<td>2011</td>
<td>MS</td>
<td>7</td>
<td>47.85</td>
<td>3.55</td>
<td>3.7</td>
</tr>
<tr>
<td></td>
<td>PhD</td>
<td>4</td>
<td>72.5</td>
<td>3.74</td>
<td>5</td>
</tr>
<tr>
<td>2012</td>
<td>MS</td>
<td>6</td>
<td>39.5</td>
<td>3.46</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>PhD</td>
<td>6</td>
<td>78.33</td>
<td>3.7</td>
<td>5.7</td>
</tr>
<tr>
<td>2013</td>
<td>MS</td>
<td>4</td>
<td>45.25</td>
<td>3.66</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>PhD</td>
<td>8</td>
<td>85.15</td>
<td>3.72</td>
<td>6.3</td>
</tr>
<tr>
<td>2014</td>
<td>MS</td>
<td>1</td>
<td>47</td>
<td>3.55</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PhD</td>
<td>13</td>
<td>69.91</td>
<td>3.59</td>
<td>5.8</td>
</tr>
<tr>
<td>2015</td>
<td>MS</td>
<td>3</td>
<td>33.0</td>
<td>3.42</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>PhD</td>
<td>14</td>
<td>69.13</td>
<td>3.75</td>
<td>5.7</td>
</tr>
<tr>
<td>2016</td>
<td>MS</td>
<td>6</td>
<td>32.6</td>
<td>3.26</td>
<td>2.58</td>
</tr>
<tr>
<td></td>
<td>PhD</td>
<td>12</td>
<td>67.41</td>
<td>3.35</td>
<td>5.27</td>
</tr>
<tr>
<td>2017 (May-August)</td>
<td>MS</td>
<td>2</td>
<td>43.5</td>
<td>3.69</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>PhD</td>
<td>6</td>
<td>66</td>
<td>3.50</td>
<td>5.83</td>
</tr>
</tbody>
</table>
Program Learning Outcomes

For doctoral students:

1. Demonstrate mastery of subject content knowledge.
2. Demonstrate effective oral and written communication skills.
3. Conduct independent research and analysis in their discipline and contribute original and substantive work in their field.
4. Demonstrate independent scientific thinking and advanced knowledge in their current discipline and in related areas of their discipline.
5. Demonstrate knowledge of basic lab safety and the requirements to assist in establishing a safe lab environment.
6. Understand ethical issues and responsibilities especially in matters related to professionalism, data collection, the laboratory setting and in writing and publishing theses, dissertations and scientific papers.
7. Professionalization into the field of study: publications, presentations, attended conferences, received funded fellowships, and professional association activities.

Program Learning Outcomes 1-4:

We created a rubric to evaluate learning outcomes 1-4. For ease in the assessing, outcomes 1, 3 and 4 were combined to evaluate students at their PhD or MS defenses. We evaluated the student separately on written and oral communication skills.

In the Fall of 2014, we began to distribute the rubric to 3 faculty members on a student’s committee at the student’s Ph.D. and M.S defenses. The overall scores for each of the outcomes assessed were averaged for each student. For each learning outcome, an average score of 1 was unacceptable; 2 was acceptable and 3 exceptional. Data were collected on 16 Ph.D students (Fall 2015-spring 2017.)

On the outcome “the student has effective oral communication skills”, 100% of our students averaged a score of 2 (acceptable) or better. On the outcome “the student has effective written communication skills, all 16 students averaged a 2 (acceptable) or better (tendency for exceptional). On the combined outcomes of 1, 3 and 4 “the student demonstrated mastery of subject content and successfully conducted independent research and analysis contributing original substantive work in their field” all 16 students averaged a 2 (acceptable) or better.

All 16 students (assessed) earned a Ph.D. in either chemistry or biochemistry.

Program Learning Outcomes 5 and 6:

All entering students complete ethics training with either the Graduate School and/or the Department of Chemistry and Biochemistry. For the past 3 years, during orientation for the first year graduate students, Professor Mary Cloninger has presented an ethics in research module
for all incoming graduate students. In addition to this classroom time, students have completed an online training certification through the Collaborative Institutional Training Initiative (CITI) offered through the University of Miami (https://www.citiprogram.org/). Students had to attend the classroom training session with Professor Mary Cloninger and pass the necessary CITI online training modules and quizzes in order to be a student in good standing in our department. We will continue this training every year for the new incoming graduate students. Last year (Fall 2016) our incoming students also had a training session in research compliance, ethics and legal issues with the Graduate School’s orientation session in August.

In the Fall of 2015, the department head implemented a mandatory fire safety training for all graduate students and TAs affiliated with the department. All graduate students in the department of chemistry and biochemistry completed a 90 min fire safety training with Skip Hougland from MSU’s Safety and Risk Management. In addition to mandatory fire safety training, all entering students for the past three years (n=35) participated in a 3-day teaching training orientation with Professor Chris Bahn. This training included a 45 minutes session on laboratory safety. All first year students in the department have to complete an online laboratory safety course through Safety and Risk Management in order to be in good standing with the department. This training will continue forward with every new entering graduate class.

**Learning Outcome 7**

For the learning outcome of “professionalization into the field of study: publications, presentations, attended conferences, received funded fellowships, and professional association activities, we initially thought that we would collect CVs from the students who obtained a Ph.D. from our department. While some students did email the graduate program director the information, multiple emails to students did not achieve the desired results. We eliminated this form of data collection and relied on the “thesis points” document. The thesis points document is a requirement for our PhD students to complete before their scheduled defense. The thesis point of one of our students can be found in Appendix E (data not shown).

We report below, a list of compiled awards, conferences attended and publications of 16 PhD students that have graduated between Dec. 2015- May-2017.

**Dr. Jacob Artz**

**Graduated in December of 2016**


**MSU Achievements**

**Awards**

<table>
<thead>
<tr>
<th>Year</th>
<th>Award</th>
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<tbody>
<tr>
<td>2016</td>
<td>Best Poster, 11th International Hydrogenase Conference</td>
</tr>
<tr>
<td>2015</td>
<td>First Prize, MSU Graduate Student Research Summit</td>
</tr>
<tr>
<td>2015</td>
<td>MSU Graduate Student Competitive Research Competition</td>
</tr>
<tr>
<td>2012</td>
<td>Presidential Graduate Scholarship</td>
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</table>
Poster Presentations

July, 2016  
11th International Hydrogenase Conference, “Structural determinants of catalytic bias in [FeFe]-hydrogenases as revealed by potentiometric EPR spectral deconvolution”

June, 2016  
Northwest Crystallography Conference, “Structural determinants of catalytic bias in [FeFe]-hydrogenases as revealed by potentiometric EPR spectral deconvolution”

October, 2015  
Montana State University Graduate Student Research Summit, “[FeFe]-Hydrogenases as a Model System for the Study of Catalytic Bias”

March, 2015  
22nd West Coast Protein Crystallography Workshop, “Structural and Biochemical Characterization of a Highly Thermostable Mercuric Reductase from Metallosphaera sedula”

PUBLICATIONS


Dr. Ashley Beckstead

Defended May 2017 (Will Graduate Summer 2017)

No current position but looking for a postdoctoral position

MSU Achievements

Awards

2014-2017  NSF AGEP-National Science Foundation “Alliances for Graduate Education and Professoriate” Graduate Research Supplement

2016  NSF Division of Chemistry (CHE) Supplement for Professional Development

2012  Meritorious Graduate Fellowship, Montana State University

PUBLICATIONS


PRESENTATIONS

Dr. Rebecca Danforth
(Defended in April-2017) Will Graduate in Summer of 2017

Current position: Instructor of general chemistry- Montana State University

MSU Achievements
Awards
2017 PhD. Dissertation Completion Award-The Graduate School Montana State University
2016  E.W. Mares Award –The Department of Chemistry and Biochemistry, Montana State University

PUBLICATIONS

PRESENTATIONS
“Ultrafast Photochemical Dynamics of the Hexaaquairon(III) Ion” Pacific Conference on Spectroscopy and Dynamics Asilomar, CA.

“Ultrafast Decay Kinetics of Hydrolyzed Iron(III) in Aqueous Solutions Upon Photoexcitation”
4th Year Seminar for the Department of Chemistry and Biochemistry, Montana State University, Bozeman, MT

“Excited State Dynamics of Aqua-Iron(III) Complexes at Low pH Utilizing Ultrafast Transient Absorption Spectroscopy” Poster presented at the annual Optec Conference, Bozeman, MT

Dr. Ethan Edwards
Graduated in Summer of 2016

Current position: post-doctoral fellow Matrivax R&D Corporation, Boston, MA

Dr. Carl Fahlstrom
Graduated in Spring of 2016

Current position: Web Development Instructor Big Sky Code Academy

Dr. Christine Gobrogge
Graduated in Spring of 2017

Offered a Postdoctoral position at CU- Boulder

MSU Achievements
Awards
2017  Montana State University Graduate School PhD Completion Award
2016  E.W Mares Teaching Award, Department of Chemistry and Biochemistry, Montana State University
2015  Montana State University Graduate Student Competitive Research Grant
2014  Montana State University Chemistry Department Nomination: Outstanding Graduate Teaching Award
2012  Mildred Livingston Presidential Award

PUBLICATIONS


ORAL PRESENTATIONS
2015  Unusual Temperature Dependent Partitioning and Solvation in Phospholipid Membranes, Fourth-year graduate student seminar, Bozeman, MT
2015  Solute Partitioning in Lipid Membranes: Using Time Resolved Spectroscopy to Understand Accumulation, American Chemical Society Northwest Regional Meeting, Pocatello, ID
2014  Reversible Partitioning in Model Membrane Systems, American Chemical Society Northwest Regional Meeting, Missoula, MT
2010  Lasers, Fluorimetry, and FRET, Student Seminar Series, Holland, MI

POSTER PRESENTATIONS
2016  Temperature Dependent Partitioning of Coumarin 152 in Phosphocholine/Phosphoethanolamine Lipid Bilayers, Materials Science Under the Big Sky Symposium, Bozeman, MT
2015  Unusual Temperature Dependent Partitioning and Solvation in Phospholipid Membranes, Optical Technology Center annual meeting, Bozeman, MT
2014  Using TCSPC and DSC to Investigate Partitioning in Mixed-Lipid Model Membranes, Optical Technology Center annual meeting, Bozeman, MT
2013  Using TCSPC to Investigate Coumarin Partitioning in Model Membrane Solutions, Optical Technology Center annual meeting, Bozeman, MT

Dr. Eric Gobrogge
Graduated in December of 2015

Current Position: postdoctoral fellow at U.S Army Research Laboratory, Rockville Maryland

MSU Achievements
Awards
2010- Mildred Livingston Grant, Montana State University
2011-2013 Letters and Science Travel Grant, Montana State University
2014  Gordon Pagenkopf Award for outstanding graduate achievement
2015  Recommended for NRC fellowship

PUBLICATIONS
PRESENTATIONS
Nonlinear Optical Studies of Cooperative and Competitive Adsorption at Aqueous/Vapor and Solid/Liquid Interfaces. ACS Northwest Regional Meeting. Pocatello, ID. 2015 (Oral)
Spectroscopic Studies of Noncovalent Interactions at Interfaces and Their Effects on Interfacial Structure, Organization, and Association, Army Research Laboratory, Adelphi, MD. 2015 (Invited Talk)
Spectroscopic Studies of Noncovalent Interactions at Interfaces and Their Effects on Interfacial Structure, Organization, and Association, Argonne National Laboratory, Argonne, IL. 2015 (Invited Talk)
Nonlinear Optical Studies of Adsorption and Organization at Silica Interfaces, Departmental Seminar, Department of Chemistry, Montana State University. 2014 (Oral)
Binary Solvent Organization at Silica/Liquid Interfaces: Preferential Ordering in Acetonitrile-Methanol Mixtures, ACS Northwest Regional Meeting, Missoula, MT. 2014 (Oral)
Nonlinear Optical Studies of Adsorption and Organization at Solid/Liquid Interfaces, Pacific Conference on Spectroscopy and Dynamics, Pacific Grove, CA. 2014 (Poster)
Spectroscopic Studies of Reversible Adsorption to Functionalized Solid/Liquid Surfaces, ACS National Meeting, New Orleans, LA. 2013 (Poster)
Spectroscopic Studies of Reversible Adsorption to Functionalized Solid/Liquid Surfaces, Gordon Research Conference on Vibrational Spectroscopy, Biddeford, ME. 2012 (Poster)
Catch and Release Chemistry: Optical studies of reversible adsorption at dendrimer functionalized surfaces, Optical Technology Center annual meeting, Bozeman, MT. 2011 (Poster)

Dr. Tim Hamerly
Graduated in Spring of 2016

Current Position: post-doctoral researcher in the Emerging Pathogens Institute, Department of Infectious Diseases and Immunology University of Florida, Gainesville

MSU Achievements
Awards
2013, 2014 Letters of College and Science Travel Grant, MSU
2013 Kopriva Graduate Student Fellowship
2013 ASMS Asilomar Conference Travel Grant
2014 ASMS Student Travel Stipend

PUBLICATIONS
Zignego DL, Mailhiot SE, Hamerly T, Schmidt EE, June RK, “Change in Joint Metabolomics Following Surgical Destabilization and Exercise in Novel Cartilage Reporter Mouse Model,” Submitted August 2015
Hamerly T, Bothner B, “Investigations into the use of a protein sensor assay for metabolite analysis,” Applied Biochemistry and Biotechnology, Published online 2015 Sep 22, 1-13

Dr. Paul Jordan
Graduated in Spring of 2016

Current position: post-doctoral fellow at Alios BioPharma, part of the Janssen Pharmaceutical Companies of Johnson & Johnson San Francisco CA

Publications

Dr. Ravi Kant
Graduated in Summer of 2016

Current position: Assistant Professor in the Department of University School of Chemical Technology (USCT) at Guru Gobind Singh Indraprastha University, Delhi, India.

MSU Achievements
PUBLICATIONS


PRESENTATIONS

Posters


Ankney, P.; Fang, X.; Kant, R.; Bothner, B. “Understanding lipid membrane structure, dynamics, and
rigidity using a quartz crystal microbalance and lipolysis”, REU, Montana State University, 2014.

Kant, R.; Rayaprolu, V.; Qazi S.; Douglas T.; Bothner B. “Understanding the stability and dynamics of P22

Celis, A; Kant, R, Bothner, B; and DuBois, J. L. Heme: substrate, product, or cofactor? Understanding the

Kant, R.; Rayaprolu, V.; Qazi S.; Douglas T.; Bothner B. “Understanding the stability and dynamics of P22

Kant, R.; Rayaprolu, V.; Qazi S.; Douglas T.; Bothner B. “Understanding the stability and dynamics of P22

Kant, R.; Movahed N.; Brooke D.; Rayaprolu, V.; Lins B.; McKenna M.; Bothner B. “What can
phylogenetic, lipase activity, and capsid stability tell us about AAV entry?” Gordon Research
Conference, Ventura, Jan. 25-30, 2015

Dr. Stephen Keable
Graduated in Spring of 2017

Current Position: post-doctoral research fellow, Department of Chemistry and Biochemistry, Montana
State University

MSU Achievements

Awards
2015 Department of Energy, Office of Science Graduate Student Research (SCGSR) Fellowship

PUBLICATIONS

substrate binding at FeMo-cofactor in nitrogenase from the structure of an alpha-70(Ile) MoFe

Guo, Y., Brecht, E., Aznavour, K., Nix, J.C., Xiao, Y., Wang, H., George, S.J., Bau, R., Keable, S., Peters, J.W.,
resonance vibrational spectroscopy (NRVS) of rubredoxin and MoFe protein crystals. Hyperfine
Interact. 222 77-90

protein at three oxidation levels via combined NRVS, EXAFS, and DFT analyses. J Am Chem Soc.
135(7) 2530-2543.

Brewster, A.S., Brunger, A.T., Calero, G., Chang, J.F., Chollet, M., Ehrensberger, P., Eriksson, T.L.,
Feng, Y., Hattne, J., Hedmean, B., Hollenbeck, M., Holton, J.M., Keable, S., Kobilka, B.K., Kovaleva,
E.G., Kruse, A.C., Lemeke, H.T., Lin, G., Lyubimov, A.Y., Manglik, A., Mathews I.I., McPhillips, S.E.,
Nelson, S., Peters, J.W., Sauter, N.K., Smith, C.A., Song, J., Stevenson, H.P., Tsai, Y.,


PRESENTATIONS


**Dr. Ryan Latterman**

**Graduated in Spring of 2016**

Current Position: post-doctoral fellow at the University of Montana in the Department of Chemistry. He will be starting as an assistant professor at Wisconsin Lutheran College, August, '17.

**PUBLICATION**


**Dr. Amanda Mattson**

**Graduated in Spring of 2017**

Current position: Instructor, Department of Chemistry and Biochemistry REU program

**MSU Achievements**

**Awards**

2008  MSU Presidential Scholarship
2011  Gold Award- 7th International Dendrimer Symposium (07/11)
Highest award for graduate work presented in both the forms of a poster and oral presentation
PUBLICATIONS

PRESENTATIONS

Dr. Melissa McIntyre
Graduated in Fall of 2016

Current Position- research scientist at ZAF Energy Systems (Columbia Falls, MT)

MSU Achievements

PUBLICATIONS


Dr. David Skowron
Graduated in Summer of 2017

Currently looking for a postdoctoral position

MSU Achievements
PUBLICATIONS

PRESENTATIONS

Dr. Charles Stark
Graduated in Fall of 2016


Dr. Alan Weaver
Graduated in Fall of 2016

Current position: postdoctoral fellow at U.S Institute of Surgical Research (San Antonio, Texas).

MSU Achievements
AWARDS
2014 Chemistry Graduate Association Travel Grant, Montana State University
2014 College of Letters and Science Student Research Travel Grant, Montana State University
2015 Montana Academy of Sciences Student Research Grant
2015 Metabolomics Travel Scholarship, University of Alabama-Birmingham

CONFERENCES & WORKSHOPS
2015 3rd Annual Workshop on Metabolomics. University of Alabama, Birmingham, Alabama

PUBLICATIONS


Fuchs A.,† Weaver A.,† Tripet B., Teintze M., Ammons M., Copié V. “Allicin Identified as the Principal Antimicrobial Compound in 1,000-Year-Old Bald’s Eyesalve.” International Journal of Antimicrobial Agents, 2016. (in review) (†authors contributed equally)


PRESENTATIONS


Dr. Daniel Willems – Graduated in Fall of 2016
Current Position: post-doctoral Fellow Montana State University

MSU Achievements
Awards
2015/2016 Kopriva Graduate Student Award

Current Graduate Student Awards and Fellowships (August 2016-May 2017)
2017– NSF Graduate Research Program Fellowship- Casey Kennedy (Erik Grumstrup)
2017-Ford Fellowship – Elizabeth Corbin (Ed Dratz)
2017-A.R. Johansson Teaching Award -Jesse Peach (Brian Bothner)
2017 –PhD Completion Awards-The Graduate School- Rebecca Danforth (Erik Grumstrup) and Christine Gobrogge (Rob Walker)
2017 Harlan Byker Research Award – Elias Pomeroy (Rob Walker)-
2016 Meritorious Award – The Graduate School- Emerald Ellis (Jen DuBois) and Elias Pomeroy (Rob Walker)
2016- Department of Energy Office of Science Graduate Student Research Program –Melodie Machovina (Jen DuBois)
2016/2017- Kopriva Graduate Awards- Arianna Celis-Luna (Jen DuBois), Amanda Byer (Joan Broderick) and Amanda Fuchs (Valérie Copié)
2016/2017 -Department of Chemistry and Biochemistry E.W Mare Award Recipients:
Michelle Aries, Allison Phillips, Christine Gobrogge, Mackenzie Norlin, Katie Link, Colin Miller, Ky Mickelsen, Rebecca Danforth, Devan Watt, Sean Zabawa
2016/2017 PhD Enhancement Award – The Graduate School (Fall) Angela Patterson (Spring) Jesse Peach
2016 Research Rendezvous poster session winner –The Graduate School, Amanda Byer (Joan Broderick)
2016 Graduate Student Association Travel Award – Eric Massaro (Erik Grumstrup), Jessica Ennist (Mary Cloninger)
2016- The Graduate School Travel Award Jacob Artz and Amanda Byer
2016 Harlan Byker Research Award – Casey Kennedy (Erik Grumstrup)
2016 Gordon Pagenkopf Research Award – Amanda Fuchs (Valerie Copie)

Current Graduate Students Poster Presentations and Workshop Attendance

Amanda Fuchs (Copié Lab) attend the Cell Symposia: 100 Years of Phagocytes in Sicily, Italy (Fall of 2016) and presented a poster titled ”Deciphering the Biofilm-Macrophage Interactome.” She also attend the Mayo Clinic Metabolomics Symposium in Rochester, MN Oct. of 2016 and presented the same poster.

Eric Massaro (Grumstrup Lab) presented a poster at the Material Research Society spring meeting in Phoenix AZ (2017) titled “Spectroscopic Characterization by Super Resolution Transient Absorption Microscopy”.


Angela Patterson (Bothner Lab) attended (1) The Gordon Research Seminar on Physical Virology and presented a poster titled “Conformational Dynamics of DNA Binding and Cas3 Recruitment by the CRISPR RNA-guided Cascade Complex.”

(2) The Gordon Research Conference on Physical Virology Structure-Function Relations in Viruses and Virus-Like Materials I presented a poster at both the seminar and the conference titled: Conformational Dynamics of DNA Binding and Cas3 Recruitment by the CRISPR RNA-guided Cascade
Mohammed Refai (Bothner Lab) attended the National Institutes of Health IDeA Program, National Resource for Proteomics Workshop (2017) Little Rock AR

Recent Publications from Current Graduate Students


Natasha W. Pettinger,a Robert E. A. Williams,b Jinquan Chena and Bern Kohler*ac “Crystallization kinetics of cerium oxide nanoparticles formed by spontaneous, room-temperature hydrolysis of cerium(IV) ammonium nitrate in light and heavy water.” Physical Chemistry Chemical Physics (5) 2017 doi:10.1039/C6CP08227K


Concluding Remarks

The learning outcomes are being met for the Ph.D. programs in chemistry and biochemistry. Our initial threshold responses as decided in Fall of 2014 were the following:

- At least 80% of students will be ranked at a level 2 or 3 in subject content knowledge, written communication, and oral communication.
- At least 90% of students will pass their defense on their first attempt.
- 100% of students will successfully complete the ethics training and lab safety training.
- At least 95% of students will demonstrate more than one form of professionalization in their field.

We will continue to keep these threshold responses although our current data indicate we are well above the 80% of our students ranked at a level 2 or 3 in subject content knowledge, written communication, and oral communication skills. We had one student that did not pass his Ph.D. on the first try but completed the requirement 6 months later on the second try (PhD awarded in Fall of 2016). 100% of our students have participated in fire safety training in the past year and 100% of our entering graduate student body in the past 3 years have completed ethics training. We can state that 100% of our graduated Ph.D. students have demonstrated more than one form of professionalization in their field.

Figure 1 – Graduation Information
From 1999-2005 the number of students that left the program without a degree was alarming. We now can account for every student leaving the program (after 2005) and provide a reason for their departure. The information gleaned can be useful. We are on average graduating our students in both chemistry and biochemistry PhD programs in less than six years. We ramped up our recruiting efforts in the Fall of 2016 with a newly formed department recruiting committee with the task to increase the number of students entering our graduate programs. Our Fall 2017 entering class is currently at 15 people and we are still receiving late applications.

Finally, the data reveal the department is succeeding in reaching its mission to graduate students with strong educational experiences that guide them for long-term professional success. With the exception of a few graduates in May of 2017 graduating class, all of our PhD graduates have found professional positions at universities or major research laboratories.

We are not making any major changes to our Ph.D. program in chemistry or biochemistry.