1) Data
Data was collected from 3 BMB PhD students, 2 students were in the first year and 1 student was in the second year of the program. The values below represent the percentage of these 3 students who were above, below or at the level expected for their year in the program. In addition faculty met to share impressions of how the program was serving the BMB PhD students.

<table>
<thead>
<tr>
<th></th>
<th>BMB</th>
<th>PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Specific knowledge of literature</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>2. Ability to critically analyze literature</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>3. Technical abilities</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>4. Quantitative abilities of field</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>5. General knowledge of field</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>6. Presentation skills</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>7. Writing Skills</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>8. Ability to formulate hypotheses and articulate methods for testing hypotheses (Ph.D.)</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>9. Ability to act as an independent researcher (Ph.D.)</td>
<td>67%</td>
<td>67%</td>
</tr>
</tbody>
</table>

2) Interpretation
The graduate program assessment summary indicates that our PhD students are meeting or exceeding expectations for their current year of study. However, the return of forms at the time this data was compiled was very low (25% return).

BMB core faculty also met to assess student learning outcomes and identified the following weaknesses in PhD student learning:
1. Weakness in advanced undergraduate biochemistry knowledge
2. Writing skills related to manuscripts, abstracts, posters and grants
3. Principles of receptor mediated signaling
4. Principles of intracellular signaling
5. Knowledge of professional networking
6. Lack of sufficient breadth in core BMB graduate courses to prepare students for research.
7. Obstacles to student engagement in proposal preparation.

3) Action
- Emphasize requirement to **attach detailed outline of research proposal** in the student's Graduate Study Plan and require students to update the proposal and discuss
cited literature in the context of their proposed research at each annual committee meeting.

- Give comprehensive exam from the previous year to entering students prior to their first semester to assess improvement in advanced biochemistry knowledge and to aid advisor in placing student in chem. 450.

- Design comprehensive exam questions to assess knowledge of principles of advanced undergraduate biochemistry. Recommendations regarding placement in chem 450 would be made by admissions committee and ultimately determined by the student’s major adviser. Students may choose to audit or attend chem. 450 lectures as a means to prepare for the comprehensive exam.
  - BMB faculty strongly supported the idea of the advance biochemistry course composed of modules usually taught in the different grad courses. The modules ‘protein structure’, ‘membranes’, ‘gene expression’, and ‘cellular signaling’ would be incorporated into the advanced course. Faculty suggested that we could offer this course in the spring 2013 as a special topics course for immediate action. The advanced course would also provide the basic knowledge that students would be responsible for on the comprehensive exam. Graduate courses would apply this basic knowledge to more theoretical, research focused topics.
  - An opportunity to offer 400 level labs to complement newly designed Cell/Mol Biology, BIO 300 (O’Brien) would provide additional laboratory experience to prepare students for 600 level core courses. Laboratory experience would improve critical thinking and technical skills.

- Graduate colloquium in BMB is currently offered. Colloquium focuses on writing manuscripts, abstracts and proposals and professional networking. Consider making 4 semesters the colloquium (1 credit per semester a requirement for a BMB graduate degree.

- Special topics receptor pharmacology course will be offered spring 2013 and submitted for consideration as a graduate level course in BMB.

- Tom Kuhn has developed a course in cellular signaling. Student feedback has indicated significant demand for this course.

- Expand breadth of core requirements
  MS and PhD: choose 3 courses from the following courses
  CHEM F654—Protein Structure and Function—3 credits
  CHEM F657—Molecular Foundations of Gene Expression—3 credits
  CHEM F674—Membrane Biochemistry and Biophysics—3 credits
  CHEM (TBA) —Receptor Pharmacology
  CHEM F670 —Cellular & Molecular Neuroscience
  CHEM F675 —Cellular Signaling (New Course)
CHEM F674—Membrane Biochemistry and Biophysics—3 credits
CHEM (TBA) —Receptor Pharmacology
CHEM F670 —Cellular & Molecular Neuroscience
CHEM F675 —Cellular Signaling (New Course)