FACULTY DEVELOPMENT PLAN
CHEMISTRY AND BIOCHEMISTRY [PROFESSORIAL]
OUTLINE

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I. SELF-ASSESSMENT

a. Current Strengths in Teaching, Researching, and Citizenship

My decision to join the faculty at BYU was based largely on my experience as an undergraduate student here; I was able to grow intellectually and spiritually from my interactions with professors and students and I felt that the unique environment at BYU would help me to excel as a teacher and scholar. Now returning as a faculty member, I feel a sense of responsibility to further the mission of BYU by helping students to grow in the gospel as well as science.

My strengths in teaching come from experience as an instructor during my postdoctoral fellowship and as an assistant professor of medicine at Duke University. There I had the opportunity to develop new curriculum and determine the type of teacher I wanted to be. Through these experiences I have grown to truly appreciate the process of explaining difficult concepts to students, which I find very rewarding.

My most developed strength lies in the area of research. As a graduate student, I studied viral pathogenesis in Dr. Vicente Planelles’ group at the University of Utah, and as a postdoctoral fellow I expanded upon my graduate studies by focusing on cancer biology in the laboratory of Dr. Sally Kornbluth at Duke University. I have maintained research momentum by publishing in upper tier journals, including Molecular Cell, Cell, Developmental Cell, EMBO Journal, Nature Cell Biology, Journal of Biological Chemistry, and others. Over the past 6 months in my lab at BYU, we have built upon these studies with exciting new data that will soon be prepared for publication and used to seek external grant funding. I currently have 2 PhD students and 7 undergraduates in my laboratory. My interactions with these students involve daily mentoring and guiding of research projects, as well as teaching laboratory techniques. I have thoroughly enjoyed working with these students. So far, 3 of my students have earned undergraduate research awards, 2 have earned cancer fellowships and 1 has earned an ORCA grant. 3 of my students have also presented their research at the American Association for Cancer Research international meeting in Washington DC.

My current citizenship involves serving on the Undergraduate Research Award Committee. There, we are trying to implement a new application process for the students that we believe will improve their grant writing skills. I am also serving on the Current Topics in Life Sciences committee.

b. Areas for Development in Teaching, Research, and Citizenship

As a new professor at BYU, I understand there are many areas for improvement, particularly in the area of teaching. These are the aspects of teaching I would like to focus on for improvement:
Develop strategies to encourage more interaction and engagement in class
Memorize students names
Develop creative and dynamic ways to introduce new topics
Continue to hone Chemistry 482 curriculum in order to 1) prepare students better for graduate school/medical school, and 2) link (and expand upon) the curriculum of Chemistry 481

In order to maintain a vibrant cancer biology research program that will benefit the mission of BYU, I need to achieve external funding. This will require promising preliminary data and excellent grant writing skills. In addition, in today’s funding climate, it is typically necessary to submit many grant proposals in order to achieve success. It will also be critical to choose exciting avenues of research and promote my research/form collaborations by interacting with the larger scientific community. Thus, the areas of research I choose to focus on will be the following:

- Develop consistent writing habits; keep to a schedule of writing daily.
- Obtain government and private funding to support graduate and undergraduate research
- Publish in top tier peer-reviewed journals.
- Guide my laboratory into exciting, productive, and fundable research areas
- Provide opportunities for undergraduate researchers to become coauthors on high-level publications
- Seek collaborations both inside and outside of BYU
- Present my research at prominent meetings and other universities.

My citizenship will be developed by learning to serve effectively and efficiently on committees. In addition, I plan to implement a departmental research in progress seminar that I hope will improve communication between faculty members and encourage collaboration.

II. TEACHING GOALS

a. Teaching Philosophy

My classroom efforts should be completely focused on helping students to grow intellectually and spiritually. As part of this effort, I hope to instill in students a love of Biochemistry and the molecular mechanisms of life. In addition, students should leave my class with a greater appreciation for the spiritual nature of life and Heavenly Father’s plan.

b. Teaching goals

Develop strategies to encourage more interaction and engagement in class
- Design homework/take-home quizzes that will prepare students better (prior to class) so that we can have higher level discussions of the subject matter in class.
- Ask appropriate questions and develop modules for group work during class

Memorize student names
• Work daily early in the semester to memorize names with the help of the picture class list.

Develop creative and dynamic ways to introduce new topics and generate student interest

• Learn to use on-line tools (learning suite and others) more effectively in order to the make class more interesting

• Regularly sit in on the class of more experienced professors to learn their teaching approach

• Be excited about biochemistry and how it relates to life and faith

Continue to hone Chemistry 482 curriculum in order to 1) prepare students better for graduate school/medical school, and 2) link (and expand upon) the curriculum of Chemistry 481

• Meet with instructors of Chemistry 481 and discuss ways to improve the relationship between the classes’ subject matter

• Continually work to incorporate (or subtract) topics in order to stay aligned with the cutting edge of the field

c. Relationship of teaching goals to university aims

The goals I have set for myself are designed with the university aims in mind: “A BYU education should be (1) spiritually strengthening, (2) intellectually enlarging, and (3) character building, leading to (4) lifelong learning and service.” In my opinion, the goals listed above are aligned with the greater mission of the university.

d. Resources needed to accomplish teaching goals

• Mentoring is critical. My senior faculty mentor is Dr. Barry Willardson, who has provided excellent guidance so far. Additionally, mentoring from other senior faculty will be important

• Sufficient time to allow for class preparation and interaction with students outside of class

III. RESEARCH GOALS

a. My research philosophy

We are endowed with a desire to understand our world. Research allows for us to freely explore the mysteries of this world, which can be tremendously fulfilling and contribute positively to society. In my laboratory, I believe that an open and collaborative environment in which cutting edge questions are addressed offers the best chance for research success.

b. Research goals

Obtain government and private funding to support graduate and undergraduate research. I plan to apply for funding from the following sources:
• NIH National Cancer Institute
• NIH National Institute of Aging
• American Cancer Society
• Susan G. Komen
• Pardee Foundation
• American Federation for Aging Research

Publish in top tier peer-reviewed journals on a yearly basis. The following list is a short sample of the journals for which our laboratory will aim:
• PNAS
• Nature Cell Biology
• Journal of Biological Chemistry
• EMBO Journal
• Molecular Cell
• Molecular and Cellular Biology

Guide my laboratory into exciting, productive, and fundable research areas
• Stay abreast of the current topics in my discipline by reading the literature and attending meetings
• Effectively manage and guide the researchers in my laboratory by holding bi-weekly lab meetings. On the off weeks, I plan to hold small group meetings with the individual research teams in my lab.
• Monitor funding sources and research funding announcements weekly.

Provide opportunities for undergraduate researchers to become coauthors on high-level publications
• Maintain a productive team of graduate students and undergraduates to allow for undergraduates to make meaningful research contributions.

Present my research at prominent meetings and other universities. I will aim to attend at least one of the following meetings each year.
• American Association for Cancer Research Annual Meeting
• Keystone Symposia
• Gordon Conferences

c. Relationship of research goals to university aims

I believe that in order to provide a state-of-the-art scientific education to undergraduates at BYU, we should stay at the top of our fields. We can accomplish this by being active scholars and contribute, through top-notch research, to the scientific community. This endeavor will require consistent funding and publishing, as stated in my goals.

d. Resources needed to accomplish research goals.

Time to pursue scholarship and the monetary resources in my start-up package.
IV CITIZENSHIP GOALS

a. Citizenship philosophy

I am committed to the idea that all of us have a responsibility to contribute, through serving on committees and working behind the scenes, in order to improve the BYU community. I understand that this will require time away from research and teaching.

b. Citizenship goals

Develop a research in progress seminar series to promote collaborations between research groups

Attend meetings and contribute creative ideas to improve the workings of the department and university.

Keep the mission of the university in mind and let it permeate my contributions to the BYU community.

c. Relationship of citizenship goals to university aims

The BYU mission statement reads: “all instruction, programs, and services at BYU, including a wide variety of extracurricular experiences, should make their own contribution toward the balanced development of the total person. Such a broadly prepared individual will not only be capable of meeting personal challenge and change but will also bring strength to others in the tasks of home and family life, social relationships, civic duty, and service to mankind.” I believe that my goals will help me stay aligned with this mission.

d. Resources needed to achieve my goals

I feel that the essential resource for citizenship contributions is time. It will be important for me to allow for time away from teaching and research in order to achieve these goals.
Course Development Project

Course title: Chemistry 689R, Mechanisms of Cell Death in Human Disease

Course purpose: Specifically, I have designed this course to bring students up to the cutting edge of apoptosis/cell death research- an area of research that underlies many of the most devastating human diseases of our time (cancer, metabolic syndrome, Alzheimer’s disease and other forms of neurodegeneration). It is my goal that, by the end of this class, students will gain a working understanding of apoptosis/cell death and be able to apply this knowledge to their own research questions. In order to achieve this goal, I must help students acquire a solid understanding of the molecular mechanisms of cell death and the history of the field.

Class breakdown: Chemistry 689R is a graduate level class of approximately 7-10 students and the topic and instructor varies from year to year. The overall topic of the class (mechanisms of cell death in human disease) is my primary area of expertise. Given the small class size, the course will be very discussion-oriented. The class schedule will be broken up by sub-topic (approximately 1-2 weeks per topic). During each 1-2-week block, there will be a mix of class discussion (based on assigned research papers), chalkboard discussion, and standard power point research presentations. All classroom discussion, assignments etc. are designed to help students read, analyze and critique prominent research papers in the field of cell death/apoptosis. I feel this is the only way to give students at the graduate level a solid background and working knowledge in this field, and thereby achieve the course purpose.

Learning outcomes:

1. Become conversant in the terminology of apoptosis/cell death research.
2. Understand the context and achievements of selected ground-breaking apoptosis papers
3. Understand how apoptosis plays a role (and is deregulated) in various human diseases, including cancer, Alzheimer’s disease, and diabetes.
4. Develop the ability to propose testable hypotheses based on the current state of the field.

Methods to measure students’ achievement of the course purpose:

1. Halfway through the semester, each student will choose a research paper to present (20 minute presentations; two per class period) and discuss with the class. By this point in the semester, I will have modeled research presentations for the students and discussed how to effectively understand and present research. I will grade these presentations based on clarity on the
subject matter, use of proper terminology, and the student’s critique of the paper.

2. At the end of the semester, each student will write a mini-review (5 pages plus figures) on one area of their choice within the field of cell death. This assignment will measure the student’s use of proper terminology, and general understanding of the field (i.e., history of the field, pressing research questions).

3. I will use on-line quizzes and take-home problem sets to motivate in-depth reading of the assigned research papers.

4. Course evaluations

Methods to measure progress and provide feedback to help students achieve learning outcomes:

1. For the class presentation assignment described above, I will provide 1 page of written feedback describing the positives and negatives for each presentation. I will meet with each student to discuss the critique.

2. For the mini-review assignment, I will have the students provide a 1 page first draft summary of the review, which I will discuss with each student individually. I will evaluate the full proposal with written feedback and one-on-one meeting if needed.

3. Given that it’s a small class, open discussions about the subject matter during class and challenging students with questions will help me determine whether students are achieving the learning outcomes.
Course overview:
This course will focus first on understanding the basic mechanisms of cell death through critical analysis of seminal papers in the cell death field. Later in the semester, once students have grasped the basic mechanisms, the course will focus on analyzing the role of cell death in various disease contexts, including cancer, neurodegeneration, and metabolic syndrome. You will be asked to present selected research papers throughout the semester and write a mini-review (aiming for the caliber of review that could potentially be submitted to an upper-tier peer-reviewed journal) on an aspect of cell death/apoptosis that you choose. In addition, there will be periodic on-line quizzes and take-home problem sets based on the reading assignments.

Learning outcomes:
1. Become conversant in the terminology of apoptosis/cell death research.
2. Understand the context and achievements of selected ground-breaking apoptosis papers
3. Understand how apoptosis plays a role (and is deregulated) in various human diseases, including cancer, Alzheimer’s disease, and diabetes.
4. Develop the ability to propose testable hypotheses based on the current state of the field.
5. Improve research paper writing skills by writing a mini-review that could potentially be submitted to a peer-reviewed journal.

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<tr>
<th>Week, Dates</th>
<th>Topic</th>
<th>Readings</th>
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<tr>
<td>1 September 3-5</td>
<td>Early observations of cell death</td>
<td>TBA</td>
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<td>2 September 10-12</td>
<td>Caspases</td>
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<td>3 September 17-19</td>
<td>Mitochondria/cytochrome c</td>
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<td>4 September 24-26</td>
<td>Factors upstream of mitochondria</td>
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<td>5 October 1-3</td>
<td>Intrinsic versus extrinsic cell death</td>
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<td>6 October 8-10</td>
<td>Student research presentations</td>
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<td>7 October 15-17</td>
<td>Student research presentations</td>
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<td>8 October 22-24</td>
<td>Alternative forms of cell death</td>
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<td>9 October 29-31</td>
<td>Autophagy</td>
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Final mini-review due December 18

Grading breakdown
20% Class participation
25% Student research presentations
15% On-line quizzes, take home problem sets
40% Mini-review

Major assignments:
**Research presentation:** Students will choose one paper from a list of research papers on the topic of cell death/apoptosis and present the paper (using power point or something similar) to the class. Presentations will be evaluated based on how well the student provided context/background for the study, overall clarity of the presentation, and proper use of terminology.

**Mini-review:** Students will choose a topic (you may choose to focus on a topic, within the cell death field, that is relevant to your own research) and write a 5 page mini-review, following standard formatting and style guidelines that one would use in an upper tier molecular biology journal. This assignment will be evaluated based on the clarity of the review, how well the student summarized research in his/her particular research niche, and formatting. The first step in this assignment is picking a topic and turning in a short summary of the review by November 14. I stress that the final review needs to be of high quality. You may end up wanting to actually submit your review to a journal!

Comment on grading/evaluation of student class performance:
Class participation is a major component of this class. Students must read the reading assignments prior to class in order to contribute to class discussion. Periodic on-line quizzes and take-home problem sets will be assigned for specific reading assignments to help prepare students for class discussion. Formal written feedback/grade will be provided for each research presentation and the mini-review. A thorough and well-written mini-review will require a hefty time commitment so start early.
Citizenship Project

In 2013-2014, I plan to establish a research in progress seminar series within the Department of Chemistry and Biochemistry. This will likely be a biweekly 50-minute seminar in which 2 faculty will split the time and present their current research, giving time for questions and discussion. I have spoken to my department chair and division leaders and all are supportive. I am currently working on acquiring funds to pay for light snacks to encourage attendance from students and other faculty. My goal in establishing such a seminar series is to promote collaboration between different research groups—I feel this an area that could be improved and would ultimately benefit everyone (i.e., better chances at research funding for faculty, better research environment for students, etc.)
**Scholarship Project**

In order to maintain a vibrant cancer biology research program that will benefit the mission of BYU, I need to achieve external funding. This will require promising preliminary data and excellent grant writing skills. In addition, in today’s funding climate, it is typically necessary to submit many grant proposals in order to achieve success. It will also be critical to choose exciting avenues of research and promote my research/form collaborations by interacting with the larger scientific community. Thus, the areas of research I choose to focus on will be the following:

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- Publish in top tier peer-reviewed journals.
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- Provide opportunities for undergraduate researchers to become coauthors on high-level publications.
- Seek collaborations both inside and outside of BYU.
- Present my research at prominent meetings and other universities.

**Goal to achieve by 2014:** Most of the goals listed above are already in progress or are long-term goals. I feel the most pressing and overarching goal to achieve during 2014 is to establish a consistent daily writing routine. I plan on writing daily and keeping notes of my time spent writing. Whether it’s 15 minutes or 3 hours of writing daily, I will consider it a successful day. If achieved, I feel it will help to achieve most of the goals above (publishing, grant writing, etc.).