The activities of the Education Committee are coordinated and closely intertwined with the activities of the APS Education Office. This report provides summaries of Education Committee activities related to each of the 2011 Strategic Plan Priorities.

2011 APS Strategic Plan Priorities

The APS mission is to promote the discipline of physiology and thereby enhance human and animal health by disseminating research discoveries, facilitating research and scientific interaction, educating the public and enabling future generations of physiologists.

1. Increase efforts to ensure awareness of, and advocacy for, the discipline of Physiology.
2. Actively work to attract, meet the needs of, engage and retain membership subgroups.
3. Develop strategies to strengthen the Society’s publications in a changing world.
4. Enhance opportunities for scientific interaction and exchange.
5. Increase the visibility of physiology in life sciences and health sciences education.

Please note the following:

- The Education Office provides support to five other APS Committees (Careers in Physiology, Porter Physiology Development/Minority Affairs, Physiologists in Industry, Trainee Advisory, and Women in Physiology) in addition to the Education Committee. This report discusses only those activities for which the Education Committee has oversight. The other Education Office-supported APS Committees also work on education and career-related areas and may have additional ongoing activities that relate to the 2011 Strategic Plan Priorities.
- The activities of the Education Committee are supported by a combination of APS funds and external grant funds.

Strategic Priority 1

Increase efforts to ensure awareness of, and advocacy for, the discipline of Physiology.

See PhUn Week in Priority 4, below.
Strategic Priority 2
Actively work to attract, meet the needs of, engage and retain membership subgroups.

I. ADInstruments Macknight Progressive Educator Award

Background: This award was established in 2011 to honor an APS member (early career or established investigator or equivalent position) and member of the Teaching Section who demonstrates the greatest potential for incorporating innovative teaching techniques and effectively utilizing technology resources in engaging undergraduate students in physiology education. The support of ADInstruments is gratefully acknowledged. Awardees receive $1,500, complimentary registration to the EB meeting, and a PowerLab LabTutor Physiology Teaching Bundle for the recipient's institution.

Update: The Education Committee received 6 applications for 2014. Each application was reviewed by all Committee members. Any Committee members with a conflict of interest recused themselves from the review. Application review criteria included:

- Greatest potential for incorporating innovative teaching techniques
- Effectively utilizing technology resources
- Engaging undergraduate students in physiology

The Committee unanimously recommended APS member Aaron Bunker of Morningside College, as the 2014 awardee. His application included a description of a laboratory activity entitled “Laboratory Group Research Project” that he developed to use in conjunction with his General Physiology class. The Research Project lab activity is an entirely inquiry-based human physiology activity spanning a 5- to 6-week period in which the students conduct their own research projects using PowerLab and LabChart Software. The lab activity includes writing a proposal, requesting and receiving IRB approval, data collection, data analysis, and an oral presentation of the research results. Dr. Bunker attended EB 2014 to receive his award.

II. EB Refresher Course

Background: The APS Refresher Courses are designed to provide for Society members both an intensive overview of content in one of the areas of physiology and an opportunity to review new teaching methods and materials for physiology instruction. They are targeted especially for non-specialists who have teaching responsibilities in the Refresher Course's content area in medical education. The Refresher Course materials are also widely disseminated via the website, APS journals, and APS Life Science Teaching Resource Community (LifeSciTRC, formerly the APS Archive of Teaching Resources). Since 1997, Refresher Course speakers have been encouraged to publish their talks as papers in the December issue of Advances in Physiology Education. Since 2002, speakers have also been invited to post their PowerPoint presentations at the APS website. Since 2006, presentations also have been available as Flash files with both audio and visuals (slides). All of these resources have been catalogued into the Archive for broad dissemination via digital libraries. Starting in 2006, attendees at the Refresher Course receive not only a printout of the speakers’ slides but also a list of LifeSciTRC resources related to the course topic. As shown in Table 1, the resources from the Refresher Courses have been viewed regularly at the APS website and, more importantly, have been downloaded nearly 20,000 times at the LifeSciTRC and have been saved by users to their folders 330 times.
Table 1: Refresher Course Resources Utilization (2002-2013)

<table>
<thead>
<tr>
<th>Title of Refresher Course</th>
<th>APS Website</th>
<th>Life Science Teaching Resource Community</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year</td>
<td>Page views</td>
</tr>
<tr>
<td>Exercise Physiology</td>
<td>2014</td>
<td>141</td>
</tr>
<tr>
<td>Immunology for the Physiologist</td>
<td>2013</td>
<td>418</td>
</tr>
<tr>
<td>Endocrinology</td>
<td>2012</td>
<td>154</td>
</tr>
<tr>
<td>Cell Signaling Physiology</td>
<td>2011</td>
<td>129</td>
</tr>
<tr>
<td>Cardiovascular Physiology</td>
<td>2010</td>
<td>591</td>
</tr>
<tr>
<td>Renal Physiology</td>
<td>2009</td>
<td>384</td>
</tr>
<tr>
<td>Respiratory Physiology</td>
<td>2008</td>
<td>574</td>
</tr>
<tr>
<td>Gastrointestinal Physiology</td>
<td>2007</td>
<td>185</td>
</tr>
<tr>
<td>Gender Differences in Physiology</td>
<td>2006</td>
<td>162</td>
</tr>
<tr>
<td>Integrating Genomics into Physiology Courses</td>
<td>2005</td>
<td>22</td>
</tr>
<tr>
<td>Cellular Homeostasis</td>
<td>2004</td>
<td>233</td>
</tr>
<tr>
<td>Muscle Physiology</td>
<td>2003</td>
<td>119</td>
</tr>
<tr>
<td>Neuroscience</td>
<td>2002</td>
<td>51</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>3,163</td>
</tr>
</tbody>
</table>

The course is on the Saturday prior to the start of EB. The major objectives of this course are to provide an overview of recent scientific advances, cutting edge techniques currently being utilized and importantly, examples of clinical diseases or disorders for each respective topic. Typically, the instructors will approach the subject as if developing a review for medical or first-year graduate students, which may also include concepts that are often misunderstood or poorly taught. The refresher course draws an enthusiastic audience of investigators and trainees who are eager to be brought up to date on these chosen topics.

**Update:** The 2014 Refresher Course on “Exercise Physiology: The Role of Exercise in Disease Prevention, Treatment, and Optimal Aging” was organized by Kim Henige and Catharine Clark. Consistent with previous years, the sessions were very well-attended (high of 350 attendees and a low of 180 attendees). Most speakers were very focused on the task of informing the audience about those areas which impact on the educational mission of the educators. However, one speaker focused more on his/her research which was not rated highly by attendees. We will continue to emphasize to the organizers that the session must focus on an update of the area of interest and not be a summary of one person's research. Nearly a third of the audience members (N=108) responded to the feedback survey. The perceived usefulness of each speaker’s presentation was rated and is shown in Table 2. Overall ratings were very high. There was a good mix of members from all APS membership categories among the 108 respondents (Tables 3 and 4).
### Table 2: 2014 Refresher Course Mean Usefulness Ratings

<table>
<thead>
<tr>
<th>Program Component</th>
<th>Rating*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise, Cognitive Function, and Aging</td>
<td>4.4</td>
</tr>
<tr>
<td><strong>Jill N. Barnes, Ph.D., Mayo Clinic</strong></td>
<td></td>
</tr>
<tr>
<td>Lifestyle Factors That Influence Vascular Aging</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>Douglas R. Seals, Ph.D., University of Colorado at Boulder</strong></td>
<td></td>
</tr>
<tr>
<td>Effects of Physical Activity on Aging and Disease: Role of Redox Signaling</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Li Li Ji, Ph.D., University of Minnesota</strong></td>
<td></td>
</tr>
<tr>
<td>Exercise–Induced Protection Against Type II Diabetes</td>
<td>4.2</td>
</tr>
<tr>
<td><strong>Kristin Stanford, M.D., Harvard University – Joslin Diabetes Center</strong></td>
<td></td>
</tr>
<tr>
<td><strong>OVERALL PROGRAM RATING</strong></td>
<td>4.1</td>
</tr>
<tr>
<td><em>On a scale of 1 (Not at all useful) to 5 (Very useful)</em></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3: 2014 Refresher Course Student Participant Demographics

<table>
<thead>
<tr>
<th>Training Level</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate student</td>
<td>8</td>
</tr>
<tr>
<td>Graduate student</td>
<td>29</td>
</tr>
<tr>
<td>Medical/professional student</td>
<td>2</td>
</tr>
<tr>
<td>Postdoc</td>
<td>12</td>
</tr>
</tbody>
</table>

### Table 4: 2014 Refresher Course Employed Participant Demographics

<table>
<thead>
<tr>
<th>Training Level</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical/professional school</td>
<td>20</td>
</tr>
<tr>
<td>College/university</td>
<td>25</td>
</tr>
<tr>
<td>Industry</td>
<td>4</td>
</tr>
<tr>
<td>Government</td>
<td>3</td>
</tr>
<tr>
<td>Non-profit</td>
<td>2</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0</td>
</tr>
<tr>
<td>Other (biology teacher, hospital, self-employed)</td>
<td>3</td>
</tr>
</tbody>
</table>

The 2015 Refresher Course, "It's All in Your Head: A Refresher Course on the Brain and Systems Control," will focus on neuroscience and is being organized by Catharine Clark and David Rodenbaugh. It will include an extensive overview of neural control in four different physiological systems. All four speakers are internationally acclaimed for their work and have confirmed their participation:

- Roger Dampney, CV, University of Sydney
- Francois Abboud (Immune, U Iowa)
- Gordon Mitchell (Respiratory, U Wisconsin)
- Michael Gershon (Gut; Columbia U)
III. Professional Skills Courses (PST)

A. Background: With support from the NIGMS Minority Opportunities in Research (MORE) division, the APS developed live and web-based short courses for members that focus on developing critical professional skills. Each course includes a strong focus on the interaction of racial/ethnic background and culture with the development of these skills. After the completion of the NIGMS project, general oversight of the PST courses resides with the Education Committee. Currently, the Education Office offers at least one PST course most months of the year (Table 5). The courses, whether online or in person have received outstanding reviews from the participants.

Table 5: 2014 APS Professional Skills Training Courses

<table>
<thead>
<tr>
<th>Month</th>
<th>Course Title</th>
<th>Details</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>Writing and Reviewing for Scientific Journals – Blended</td>
<td>This online and 4 day/3 night live course provides an opportunity to work with leading experts on improving a first-author draft manuscript while learning the essentials of scientific writing and reviewing. ($800)</td>
<td></td>
</tr>
<tr>
<td>February/March</td>
<td>Presentation Skills Online: Creating a Powerful Meeting Poster</td>
<td>This 7 day online course provides information on how to organize and create an effective and engaging scientific meeting poster. ($180; Member $90)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Presentation Skills Online: How to Present a Scientific Poster</td>
<td>This 7 day online course teaches the essentials of presenting a poster to multiple audiences at a scientific meeting. ($180; Member $90)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Presentation Skills Online: How to Network at a Scientific Meeting</td>
<td>This 7 day online course provides the knowledge and skills needed to successfully network at a scientific meeting. ($180; Member $90)</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>Interviewing Skills Online: Interviewing for an Academic Position</td>
<td>This 10 day online course provides resources needed to start a job search, prepare a cover letter and research statement, have a successful interview, and present an engaging job talk. ($350; Member $175)</td>
<td></td>
</tr>
<tr>
<td>June-Aug</td>
<td>Writing and Reviewing for Scientific Journals Online</td>
<td>This 6 week online course provides an opportunity to work with leading experts on improving a first-author draft manuscript while learning the essentials of scientific writing and reviewing in an online environment. ($400-500; Member $200-250)</td>
<td></td>
</tr>
<tr>
<td>September</td>
<td>Interviewing Skills Online: Interviewing for an Industry Position</td>
<td>This 10 day online course provides resources needed to start a job search, prepare a cover letter &amp; resume, have a successful interview, and present an engaging job talk. ($350; Member $175)</td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>Presentation Skills Online: Writing a Powerful Meeting Abstract and Title</td>
<td>This 7 day online course provides an opportunity to receive valuable feedback on a first-author abstract while improving meeting abstract and title writing skills. ($180; Member $90)</td>
<td></td>
</tr>
</tbody>
</table>

B. Blended Short Courses:
“Blended” PST courses include both online lessons and in-person activities. In January 2014, APS offered the live PST Course on Writing and Reviewing for Scientific Journals. Twenty-two students participated in the course, and APS members, Sue Barman, Heddwen Brooks, Robert Hester, Mark Knuepfer, Sadis Matalon, and David Pollock served as instructors. This course is targeted toward upper-level graduate students and lower-level postdoctoral fellows who are working towards completing their first first-author manuscript. In the course, students learn the essentials of manuscript writing and reviewing while gaining valuable opportunities for networking and collaboration. The course includes an online component (pre-workshop readings, exercises, and reflections) and a weekend live workshop that includes nine plenary sessions that combine lecture, group activities, and instructor panels.

In July 2014, APS will again be partnering with the Brazilian Physiological Society to offer a PST Course on Writing and Reviewing for Scientific Journals. The course will be held in conjunction...
with the 2014 PanAm Congress in Brazil at the University of São Paulo, São Paulo, Brazil. Twenty-five students are expected to participate and APS members Sue Barman, Kim Barrett, Jane Reckelhoff, David Pollock, and Irv Zucker will be instructing the course.

C. Online Courses:
The online courses are scheduled throughout the year and, using interactive technology through Blackboard.com and GoToMeeting, offer a convenient and effective mechanism to offer professional development to more students at a reasonable cost. As shown in the table above, the APS offers a number of online courses each year and the number of students taking the courses is increasing as their availability and quality becomes more known. Our best advertisement is a recommendation by a previous student and/or their research advisor. During the 2013-2014 academic year, 36 students participated in the online courses, and APS members Sue Barman, Robert Carroll, Erin Keen-Rhinehart, Rebecca Persinger, Andrew Roberts, Kathy Ryan, Maria Urso, and Johana Vallejo served as instructors.

D. New Course Development – Publication Ethics
Background: The Education Office and Publications Department, in collaboration with the Society for Biological Engineers and Biomedical Engineering Society, received funding from NSF to support the development of professional skills training modules on publication ethics. The modules will provide a relevant and current knowledge of and appreciation for the facts and principles of the eight most common publication ethics issues, as well as the tools needed to integrate and apply the guidelines to actual situations using professional standards of practice. The education modules will serve as tools for use by higher education institutions, laboratory groups, individuals, and professional societies and will incorporate proven materials and methods, as well as novel approaches. They will be effective for US and international graduate students in science and engineering programs and will integrate easily into Responsible Conduct of Research (RCR) training. The project will also develop an online Community of Practice (COP) designed to engage trainees and experienced scientists and engineers in ongoing discussions about scientific publishing, publication ethics, and professional standards of practice in these areas.

Update: Over the past year, the project staff used input from the Advisory Board to develop modules on authorship, conflicts of interest, data falsification/fabrication, duplicate publication of data and redundant publication, figure preparation/presentation, plagiarism, and animal-human subjects welfare. The draft modules were successfully field-tested with graduate students at the January 2014 PST in Orlando, FL. Participants completed not only an entry and exit survey but also pre, post, and follow up exams to assess whether they could apply professional standards of practice to real-life scenarios. Results indicate that scores rose significantly on the post test. Follow up exams are currently being graded. In addition, a matched comparison group of graduate students completed the pretest and follow up test. When graded, these will provide additional information on the effectiveness of the modules. In the coming academic year, RCR instructors will review the modules and test them in RCR courses. PIs Matyas and Christina Bennett welcome suggestions of RCR instructors to recruit for this review and testing.

E. New Course Development – Becoming an Effective Teacher
The Education Committee is collaborating with the Teaching Section and the APS Education Office on the development of a new PST that will be offered at the 2014 APS Institute on Teaching and Learning in June. As per our standard PST development protocol, the topics, learning objectives, and recommended activities were developed by an advisory board of experts. In September 2013, Wyss and Teaching Section chair, Barbara Goodman met with APS Education Office staff, and APS members Sydella Blatch (Stevenson Univ), Kim Henige (CSU-Northridge), David Holtzclaw, Erin Keen-Rhinehart (Susquehanna Univ), Johanna Krontiris-
Litowitz (Youngstown State Univ), Guruprasad Madhavan (National Academy of Sciences), Jenny McFarland (Edmonds Community College), Kevin Patton (Saint Charles Community College), Dee Silverthorn (Univ of Texas), and Steven Swoap (Williams College). The resulting course, “Becoming an Effective Teacher,” is a blended course, consisting of both pre- and post-live course online assignments along with the 5-day in-person portion of the course. The online portion of the course began on April 7 and will run through August 30, 2014. The in-person portion of the course will be held concurrently with the Institute on Teaching and Learning, June 23-27, at the College of the Atlantic in Bar Harbor, ME. A total of 12 students are enrolled in the course (cost $800). APS requested and was granted 3 graduate credits by Adams State University to offer to participants who successfully complete the course. A course schedule is included in Appendix B.

IV. Support for APS Member Educators

A. Medical Physiology Course Directors

Background: Since 2005, the APS and ACDP have co-sponsored an online resource site for medical physiology course directors. Resources include information on faculty evaluation, course evaluation, curriculum issues, and instructional options. Interested course directors meet annually at EB to receive updates on the resources already available at the website and to share materials to further populate the site. The group continues to develop into a networking and discussion group to both share resources and raise awareness of problems and solutions in medical physiology education. Starting in 2008, the directors began bringing resources to share related to the APS Refresher Course topic.

Update: APS staff members launched a new version of the Medical Physiology Course Directors website that includes secure access for course directors only. This enhancement will allow them to share assessment resources such as case studies and test items securely. Announcement of the new site and a request for new materials to post has been sent out on the Medical Physiology Course Directors listserv. In addition, the LifeSciTRC has added secure bulletin boards and blogs which will allow the group to have “members only” online discussion and resource sharing.

Over the last year, the Committee and staff have organized the preliminary meeting for planning a national meeting of the proposed Association for Physiology Professional Education Leadership (APPEL). In August, the 15 members of the planning committee will convene in Bethesda to plan for the 2015 national APPEL meeting. The Education Committee believes that this national meeting dedicated to the needs and interests of physiology course directors will significantly enhance the presence of physiology in the curriculum of health-related schools and improve the quality of medical physiology education by increasing the awareness of and access to resources for instructional enhancement and faculty development. We propose that a 2-3 day meeting in the summer or fall would provide the greatest opportunity for course directors to participate. Chairs and deans are likely to support travel and attendance costs for such a meeting, and networking and information exchange at the meeting will inform the process of physiology education at medical and professional schools in response to new accreditation criteria, changing faculty demographics, shifting department and medical school structures, changing emphasis on admission and licensing exams and new teaching technologies, including the increasing presence of distance/virtual learning methods. Sharing of methods and ideas might have the added benefit of stimulating greater academic scholarship among physiology course directors leading to future submissions to Advances in Physiology Education.

This proposal follows a model used to foster the involvement of APS with the National Directors of Graduate Studies (NDOGS) in pharmacology, which began with a small contingent of
physiologists at the 2009 NDOGS meeting in New Orleans that led to joint meetings in 2011, 2013 and 2015. ([www.aspet.org/knowledge/NDOGS-in-Pharmacology](http://www.aspet.org/knowledge/NDOGS-in-Pharmacology)). Similarly, the Association of Biochemistry Course Directors ([www.abcd.wildapricot.org](http://www.abcd.wildapricot.org)) met for a pilot planning meeting in 2008 and have been meeting every other year since 2009.

The Committee expects to present to the Council the proposed preliminary schedule and a funding request for the APPEL meeting at the Fall Council meeting.

B. Medical Physiology Competencies Project

**Background:** This project is an outgrowth of the ongoing APS/ACDP Medical Physiology Learning Objectives program which has developed and updated guidelines for the breadth and depth of knowledge in the physiological principles and concepts that are considered minimal and essential for further progress in understanding mechanisms of disease and body defenses, particularly in medical training (see [http://www.the-aps.org/education/MedPhysObj/](http://www.the-aps.org/education/MedPhysObj/)). These objectives have been used extensively by physiology educators in professional schools to both identify critical content and justify the need for physiology education course hours.

**Update:** During the past two decades medical education has experienced a wave of reform. The changing reforms are influencing attitudes towards education with the goal of reshaping the traditional educational into a learner-centered experience. The most recent reform contains specific competencies within the sciences fundamental to medicine that all students should demonstrate before the completion of their degrees. Therefore, rather than didactic lectures organized in vertical and isolated disciplines, most medical schools have already moved toward substantial horizontal integration of courses. This trend continues to evolve, with increasing mixture of patient contact and flipped-classroom techniques into classroom education. As lecture hours are reduced, students are increasingly learning from electronic media. In many schools, the move to integrate disciplines has eliminated any class officially termed Physiology. This has likely not reduced the importance of physiology, but definitively its visibility. Consequently, we face an important need to identify the essential contributions of physiology to understanding and treating of disease, while making certain that our students appreciate these contributions. One step toward this goal is to formulate essential physiology content as competencies require for graduation from all medical schools.

Under the leadership of Robert Carroll, physiology competencies are being developed for dissemination by APS for publication later this year. A detailed rationale for the competencies development process is included in Table 6.
There is no template that can describe competencies for all institutions. Course or program competencies should reflect the vision and mission of the institution. Those competencies must be specific, clear, and manageable. The outcomes must also be generalizable to different levels of learning while providing some flexibility for individualized growth and development. Lastly, the outcomes must be related to one another. Those relationships must be clear to the learner. The core competencies are derived from those defined and provided by the American College of Graduate Medical Education (ACGME). Those competencies are broken up into categories. Those categories are Patient-centered care and clinical skills, medical knowledge, practice-based learning, interpersonal and communication skills, professionalism, and system-based care. Each of these categories possess anywhere from three to eleven sub-competencies (total of 39 competencies). This set of competencies is very specific and clear. However, the structure and number of sub-competencies makes the list unmanageable and not easily generalized to a first-year medical student. Nor do the relationships between these competencies and curriculum is apparent to the student body. A more simplified system might promote more integration and holistic education program at my institution.

The Three-circle model (Figure 1.) for learning outcome classifications described by Harden et. al. (1999). It is based upon the premise that there are three core elements to what a physician needs to do. The first element deals with ensuring that the physician “do the right thing” or possess technical intelligence. Competencies in this category include: clinical skills, practical procedures, patient investigation, patient management, disease prevention and health management, communication, and information handling skills. The second element is deals with ensuring that the physician “does the thing right”. This represents analytical, emotional and intellectual intelligences necessary for accurate decision making. Competencies in this category include: Knowledge of principles related to basic and clinical sciences, legal and ethical knowledge pertaining to healthcare, and clinical reasoning. The final element deals with ensuring that the physician is “the right person”. Competencies in this category include: understanding the role of the physician within the health care system, and personal development such as independent learning, and self-awareness/regulation.

Concept map to expand on the three circle model and the integration of specific competencies within each circle. For example, medical knowledge includes informational handling skills, clinical skills and practical procedures as a physician. This medical knowledge is both part of approach to task (planning), and performance on task (implementation). All the while, the physician needs to keep the patient informed. Thus, communication with is part of professionalism is also linked to this competencies.
C. Physiology Graduate Program Directors

**Background:** Towards developing a forum for graduate directors, the APS partnered with the American Society of Pharmacology and Experimental Therapeutics (ASPET) to organize the 2011 and 2013 National Directors of Graduate Studies (NDGS) in Pharmacology and Physiology meetings, hosted by the Dept. of Pharmacology & Toxicology at Michigan State University in East Lansing and by the Department of Integrative Physiology at the University of North Texas Health Science Center, respectively. The Education Committee helped select APS-sponsored speakers for the meeting.

**Update:** The 2015 meeting is being planned in close cooperation between APS and ASPET. An Education NDGS subcommittee is working with the NDGS planning group. Special thanks go to Chip Montrose for his strong support in this effort. APS has already received and approved a funding request from NDGS for the 2015 meeting. In addition, the APS Education Office will build a meeting website on the APS website and ASPET will handle registration.

**Funding Request (Budget):**

| Action Item 1: The Committee requests up to $3,000 for the NDGS subcommittee members to attend the meeting if speaker funds are not available for their travel. |

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**Strategic Priority 4**

Enhance opportunities for scientific interaction and exchange.

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**I. Sharing Resources at the International Association of Medical Science Educators (IAMSE)**

**A. Background:** The Committee, with support from staff, exhibits at the IAMSE Annual Meeting. IAMSE’s mission is “to advance medical education through faculty development and to ensure that the teaching and learning of medicine continues to be firmly grounded in science.” The APS Education Committee has coordinated staffing an exhibit at the IAMSE meeting for several years. Budget includes an exhibit table and materials but no travel support for staff or APS members.

**B. Update:** In 2013, Education Committee liaison member Robert Carroll staffed an exhibit table at IAMSE, June 8-11, in St. Andrews, Scotland, and represented the APS. He shared information on APS membership, the Medical Physiology Learning Objectives, Medical Physiology Course Directors web, Professional Skills document, and the APS Archive of Teaching Resources.

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**II. Human Anatomy and Physiology Society (HAPS) Collaboration**

**A. Background:** HAPS is an association of anatomy and physiology educators from community and four-year colleges as well as high schools. The APS collaborates with HAPS in a number of ways, including exhibiting and conducting workshops at HAPS meetings. HAPS also is a partner in the LifeSciTRC, cataloguing past issues of their journal, *HAPS Educator*, and resources developed through the HAPS Institute program for free access in the digital library. The Education Committee identifies an APS-sponsored keynote research update speaker each year for the HAPS Conference.

**B. Update:** The 2014 HAPS Conference was held May 24-26 in Jacksonville, FL. A number of HAPS members stopped by the APS exhibit booth to thank APS for its continuous support of the HAPS meeting. APS member Anne Schreihofer, University of North Texas Health Science Center, gave a presentation entitled “Cardio-respiratory integration by the caudal ventrolateral
medulla: Insights from acute and chronic intermittent hypoxia.” Dr. Schreihofer’s talk was the only keynote speaker this year to focus on science research and was very well received. Many positive comments were given about the presentation. APS also conducted two hands-on workshops during the meeting for high school and undergraduate teachers focusing on student-centered learning and APS materials from the LifeSciTRC.

III. Natl. Association of Biology Teachers (NABT) Conference

A. Background: NABT is a professional organization of biology educators, primarily from K-16. The Education Committee identifies an APS-sponsored keynote research update speaker each year for the NABT Professional Development Conference. Typically, the APS also has an exhibit booth and hands-on workshop.

B. Update: The 2013 NABT Professional Development Conference was held Nov. 20-24th in Atlanta, GA. APS member Gordon Giesbrecht (University of Manitoba) gave the presentation, “Goal Setting: Lessons Learned from 100 Nights on Lake Winnipeg.” The keynote address was very well attended with good interaction between Dr. Giesbrecht and the attendees during the question and answer period that followed. “Ideas for Using Next Generation Science in Your Classroom,” a workshop developed by the APS Education Office to help teachers focus on student centered activities, gave teachers a chance to try four hands on labs from the LifeSciTRC. This year’s conference celebrated the NABT 75th Anniversary which helped bring in a record number of attendees. The APS booth had a steady stream of traffic and there were four past Frontiers Teachers in attendance. The 2014 conference will be in Cleveland, OH in mid-November. Merry Lindsey, University of Mississippi, will serve as the APS keynote speaker.

IV. Natl. Science Teachers Association (NSTA) Conference

A. Background: NSTA is a professional organization for science educators K-14. The Education Committee is exploring the possibility of increasing the APS presence at this conference after an absence of several years because of the broad reach of NSTA into both elementary and undergraduate education.

B. Update: While there was no APS presence at the national conference this year there were former Frontiers teachers in attendance at two of the three regional conferences. This year’s fall regional conferences will be in Richmond, VA, Orlando, FL, and Long Beach, CA. The 2015 national conference is scheduled for Chicago, IL. There will be past Frontiers Teachers (Julie Smith and Kyle Duhon 2012) who will act as APS representatives, giving a workshop on APS Six Star Science and the Frontiers in Physiology Summer Research Fellowship.

V. Association for Middle Level Education (AMLE) Conference

A. Background: AMLE is a professional organization for anyone in education who works with students in 5-9th grades. It is not a “science-only” organization nor is it a “teacher-only” organization, but includes administrators, counselors, and informal and formal educators.

B. Update: This year’s meeting was held November 7th-10th in Minneapolis, MN and was the 40th Anniversary Conference. The APS presence was a huge success in their third appearance at AMLE. There was tremendous interest in science, but few science workshops. Margaret Shain Stieben and Miranda Byse presented, “How do I Use the Next Generation Science Standard in my Classroom?” AMLE conducted workshop surveys at the conclusion of the workshop; the APS workshop scored 4.5-5 on a five point scale in every category. The APS booth was once again very busy with teachers interested in science materials and information on the LifeSciTRC.
This year’s conference will be in Nashville, November 8th-11th. The Education Office plans to exhibit and conduct a workshop again. This is an age group that is of vital importance in expanding the pipeline to biomedical research careers.

VI. Council for Undergraduate Research (CUR)

A. Background: CUR is a professional society that supports and promotes high-quality undergraduate student-faculty collaborative research and scholarship. CUR and its affiliated colleges, universities, and individuals share a focus on providing undergraduate research opportunities for faculty and students at all institutions serving undergraduate students. This is the second time APS has attended this biennial conference.

B. Update: APS is working with CUR on recruitment of underrepresented students for summer research experiences with support from a joint NSF grant. APS assisted in the planning of a new CUR Institute on "Broadening Participation" that was held March 7-9 at Johnson C. Smith University in Charlotte, NC. The biennial CUR Conference will be held June 28-30, 2014 in Washington, DC. APS staff members Melinda Lowy and Brooke Bruthers are organizing a symposium on model undergraduate summer research programs that also features Leadership Alliance and ASPET programs, as well as presenting a poster on APS programs.

VII. Liaison with The Physiological Society (TPS), London

A. Background: The Education Committee has worked for several years to coordinate more effectively with the educational efforts of TPS. The chair of the TPS Education and Outreach Committee (EOC) typically attends the fall and EB APS Education Committee meetings. The APS Education Committee chair and Director of Education Programs have been invited to attend TPS EOC meetings. Our collaborations and communications with TPS have resulted in TPS incorporating the APS Bruce Awards model into their annual meeting. They are also interested in mirroring some of our K-12 initiatives in the UK.

B. Update: In 2014, Wyss and Matyas attended and presented at the IUPS Education Workshop, IUPS, and the TPS Education Committee meeting. Also, Wyss assisted in judging the Bruce Awards corollary (Rob Clarke awards). The IUPS Education Workshop had capacity attendance and an excellent program. Matyas won an award for her presentation on the development of the PhUn Week Community. In the PhySoc Education meeting, we had a lively and productive conversation about ways to collaborate with PhySoc on educational projects. PhySoc has now become an official member of LifeSciTRC and will work with APS on the concept of MOOC development. They are clearly ahead of APS in this realm, and we hope to learn much from their successes and missteps in this arena. PhySoc had hoped to have an APS education representative at their summer meeting to launch their participation in the Archive but the meeting proximity to the APS Conference, “Institute on Teaching and Learning,” made this difficult.

At EB 2014, the PhySoc executive director was enthusiastic about expanding the education workshops/posters at the PhySoc/APS meeting in Dublin in 2016. To organize this event, Wyss and Matyas were asked to attend the PhySoc Education Meeting in Edinburgh in March, 2015.
Strategic Priority 5
Increase the visibility of physiology in life sciences and health sciences education.

VIII. Life Science Teaching Resource Community (Archive of Teaching Resources)

A. Background: APS developed the Archive of Teaching Resources as a free digital library of teaching resources. It serves as the main dissemination route for APS education and career materials. All career materials that are available at the APS website are also catalogued in the Archive. The Archive has partnerships with a number of professional societies: Human Anatomy and Physiology Society (HAPS), Society for Developmental Biology (SDB), American Association of Anatomists (AAA), Northwest Association for Biomedical Research (NWABR), Massachusetts Society for Medical Research (MSMR), and National Association for Health and Science Education Partnerships (NAHSE). These partners add their own peer-reviewed materials to the Archive, making it a collaborative effort. It includes both materials published by APS and materials contributed by individual physiologists. In addition to articles in *Physiology*, *Advances in Physiology Education*, and *The Physiologist*, staff catalogue press releases on journal articles, all multimedia presentations from EB career-related symposia, video contest entries, and APS podcasts. The Archive is also a partner in the National Science Digital Library (NSDL) Pathways to the Biological Sciences online portal. This portal, BioSciEd Net or “BEN,” is housed at the AAAS. APS is a founding partner in the BEN collaborative. At BEN, users can freely search the peer-reviewed resources of more than 25 professional societies. These partnerships mean that the APS resources are searched by tens of thousands of educators at multiple sites.

B. Update: In April 2014, the APS Archive of Teaching Resources relaunched as the Life Science Teaching Resource Community (LifeSciTRC). This transition marked a culmination of efforts by APS and the partnering professional societies to advance beyond an online library to a community of practice for life science educators. The LifeSciTRC now offers community pages, blogs, forums, resource ratings, resource comments, and a monthly newsletter specific to life science educators. In addition to the new name, the LifeSciTRC also added three new scientific
society partners: The Physiological Society, Genetics Society of America, and American Society of Plant Biologists.

The LifeSciTRC added 69 new resources since January 1, 2014 and now includes more than 6,700 peer reviewed teaching resources. From these resources, more than 150 collections of items have been created by Archive Partners and Archive Users. More than 7,300 individuals have registered to use the LifeSciTRC, but many more use the site (registration is not required).

C. Scholars Program: With support from NSF, the LifeSciTRC has implemented two professional development programs for K-12 and undergraduate educators. The LifeSciTRC Scholars program is an online fellowship where educators learn how to find and use digital resource to enhance student-centered learning in their classroom. Those who excel in the Scholars program may be invited to become LifeSciTRC Fellows. Fellows go beyond using the digital library and learn how to participate in the LifeSciTRC online community. Fellows also serve as mentors for LifeSciTRC Scholars. To date, 54 undergraduate educators and 18 high school educators have been LifeSciTRC Scholars, while 5 undergraduate educators and 2 high school educators have been LifeSciTRC Fellows. The next LifeSciTRC Scholars and Fellows Programs will run this summer.

II. Physiology Education Community of Practice (PECOP) Research Collaboration Network
APS members Barbara Goodman and Jenny McFarland along with Marsha Matyas were successful in securing a pilot grant from NSF to help support the APS conference, “Institute on Teaching and Learning” and to begin building an online community of physiology educators (see Project Summary in Table 7). The grant provided support for
1. a PECOP Fellowship for undergraduate physiology educators seeking to build their professional networks and become engaged in the scholarship of teaching and learning
2. PECOP Thought Leaders with expertise in teaching best practices and /or educational research who will work as leaders and collaborators for both PECOP Fellows and the wider community
3. Development of online forums and events to promote best practices in teaching and educational research collaborations

In 2015, the PIs will develop a proposal for a 5-year NSF grant to further develop the community.

<table>
<thead>
<tr>
<th>Table 7: PECOP Project Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>This proposal requests support for an Incubator project to establish a new RCN in Undergraduate Biology Education by the American Physiological Society (APS). The RCN, the Physiology Educators Community of Practice (PECOP) will center primarily on undergraduate education but encompass multiple teaching levels (K-12, grad/professional), include international and novice educators, and promote strong participation by faculty at institutions serving underrepresented students (underrepresented minorities, persons with disabilities and persons from disadvantaged backgrounds). APS has developed key components to support the PECOP, including an National Science Digital Library with tools to build and support teaching/learning communities (APS Archive of Teaching Resources, <a href="http://www.apsarchive.org">www.apsarchive.org</a>), online faculty development to promote online community involvement, and new support for a biannual conference on teaching and learning which will offer workshops and sessions for faculty from all types of institutions. The conference will serve as 1) a forum to begin building the PECOP structure and management and recruit participants, encouraging educators to interact, share resources, and collaborate on an ongoing basis; 2) an opportunity for physiology educators to learn how to use scholarship of teaching and learning (SOTL) methodologies to improve their teaching; and 3) offer professional skills training for new physiologists on effective teaching methods, including SOTL. We will use the Archive community tools and the new teaching conference to organize and launch PECOP, a support community that provides resources, training, mentoring, and community benefits for the teaching of physiology. The proposal will</td>
</tr>
</tbody>
</table>
provide support for organizing the initial PECOP goals, activities, and governance structure. It will recruit and organize Thought Leaders who will guide discussions not only at the conference but online through blogs and discussions on key topics such as curriculum development, student-centered learning, assessment, effective undergraduate research experiences, and SOTL methods. It will also offer faculty from institutions serving underrepresented students support to both attend the meeting and be active participants in the ongoing community. Finally, it will provide support to promote participation in PECOP via regional and national meetings of physiology educators.

III. David S. Bruce Awards

A. Background: The David S. Bruce Awards were established in 2004 to recognize excellence in undergraduate research. They are made annually at EB to undergraduate students who have submitted both abstracts for the meeting and award application materials. Abstracts are reviewed by the Education Committee to select recipients of the David S. Bruce Outstanding Undergraduate Abstract Award. Beginning in 2013 as a result of a donation, abstract awardees receive $100, as well as two years of undergraduate student membership in the APS. In 2012, the Committee voted that Abstract Awardees must attend EB in order to receive the monetary award. These students are then eligible for further judging at the EB meeting. They present their posters and are interviewed by the Bruce Award Subcommittee, which includes members of the Education Committee, as well as additional Society members. Those students selected on the basis of the interviews and poster presentations receive the David S. Bruce Excellence in Undergraduate Research Award, as well as $400. Beginning in 2013, an APS member donated funds to allow the top-ranked Research Awardee to receive $750.

B. Update: In 2014, the Bruce Awards program has continued to mature, as evidenced by the significant increase in the number and overall quality of the applications, abstracts, posters and presentations. In view of the strategy to increase exposure of undergraduate students to physiology, we also noted greater participation of students from particular schools as well as an increase in the number of participating institutions. Moreover, the interest of the competitors in basic science careers, rather than clinical medicine, also has increased. Although this impression is based on primarily anecdotal information, all of this year’s David S. Bruce Excellence in Undergraduate Research winners professed to wanting to enter research intensive careers. From their presentations, they are clearly on this trajectory. Thus, the Bruce Awards remain an excellent mechanism for enhancing the pipeline to professional careers in physiology.

There is also significant synergism with the four undergraduate fellowship programs, the participants of which attend EB (STEP-UP Fellows attend a separate STEP-UP Symposium). Ten of the 30 David S. Bruce Outstanding Undergraduate Abstract Awardees and 3 of the 14 David S. Bruce Excellence in Undergraduate Research Awardees were recent participants. The Committee thanks the Council members for their strong support of this program and for their presence at the awards ceremony.

The Committee notes that the Bruce Award Program also speaks to Strategic Priority 2: Actively work to attract, meet the needs of, engage and retain membership. The Bruce Awards are particularly important for many of the physiologists at undergraduate institutions, who every year send their brightest and best to participate in these sessions. We also noted that our inclusion of early career-stage physiologists in the Bruce Award judging process enhances and encourages their professional development and participation in APS activities, programs and networking with colleagues.

In 2014, 88 applications were received and 30 Undergraduate Abstract Awardees were selected (see Appendix A). From these awardees, a subcommittee organized by Committee member
Andrew Roberts selected 14 Undergraduate Research Awardees (Table 8). In addition to support from the APS, the David S. Bruce Award program has received generous contributions from the Association of Chairs of Departments of Physiology and individual APS members John M. Horowitz, Barbara A. Horwitz, Ida J. Llewellyn-Smith, and J. Michael Wyss. This support is gratefully acknowledged.

Table 8: David S. Bruce Excellence in Undergraduate Research Awardees

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Research Host</th>
</tr>
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<tbody>
<tr>
<td>Dong, Frederick</td>
<td>Cornell University</td>
<td>Robin L. Davisson, Ph.D.</td>
</tr>
<tr>
<td>Ferland, David*</td>
<td>Michigan State University</td>
<td>Stephanie W. Watts, Ph.D.</td>
</tr>
<tr>
<td>Frazier, Rebecca</td>
<td>Susquehanna University</td>
<td>Erin M. Keen-Rhinehart, Ph.D.</td>
</tr>
<tr>
<td>Horwath, Julie A.</td>
<td>Cornell University</td>
<td>Robin L. Davisson, Ph.D.</td>
</tr>
<tr>
<td>Kruse, Sarah M.</td>
<td>Mayo Clinic</td>
<td>Jill N. Barnes, Ph.D.</td>
</tr>
<tr>
<td>Laws, Maxwell T.</td>
<td>Wayne State University</td>
<td>Patrick J. Mueller, Ph.D.</td>
</tr>
<tr>
<td>Mack, Jacob</td>
<td>University of California, Davis</td>
<td>Barbara A. Horwitz, Ph.D.</td>
</tr>
<tr>
<td>Mikhailova, Alexandra</td>
<td>University of California, Davis</td>
<td>Barbara A. Horwitz, Ph.D.</td>
</tr>
<tr>
<td>Peterson, Jenna M.</td>
<td>University of Minnesota, Duluth</td>
<td>Jean F. Regal, Ph.D.</td>
</tr>
<tr>
<td>Savarese, Mary</td>
<td>Elon University</td>
<td>Jennifer K. Uno, Ph.D.</td>
</tr>
<tr>
<td>Skolka, Michael P.</td>
<td>Messiah College</td>
<td>R. Alberto Travagli, Ph.D.</td>
</tr>
<tr>
<td>Tank, Ericka M.</td>
<td>University of Iowa</td>
<td>Gary L. Pierce, Ph.D.</td>
</tr>
<tr>
<td>Tosto, Jenna</td>
<td>William Paterson Univ. of New Jersey</td>
<td>Jorge M. Serrador, Ph.D.</td>
</tr>
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</table>

*Top Ranked Awardee

As the Bruce Award program has matured, the overall quality of the posters and presenters continues to improve. Moreover, the interest of the competitors in basic science careers, rather than clinical medicine, also has increased. Although this impression is based on primarily anecdotal information, all of this year’s David S. Bruce Excellence in Undergraduate Research winners, all professed to wanting to enter research intensive careers, and from their presentations, they are clearly on that trajectory. Thus, the Bruce Awards remain an excellent mechanism for enhancing the pipeline to professional careers in physiology.

IV. Experimental Biology Undergraduate Poster Session

A. Background: Since 2004, the APS has invited all undergraduate students who are first authors on abstracts submitted to APS EB sessions to present their posters at a special APS Undergraduate Poster Session. This session is typically held on Sunday afternoon and serves as the reception to announce the David Bruce Awardees. Physiology departments are invited to purchase table space to promote their graduate programs to the undergraduate attending the session. Refreshments are provided. APS members are invited to attend, view the posters, and talk with the undergraduate students.

B. Update: At EB 2014, approximately 200 APS members came to see 167 undergraduate physiology posters and to talk with the students. As shown in Figure 1, this is the largest group of students to date and represents an 86% increase since 2011. In addition, students from the American Association of Anatomists (AAA) presented their research. This year, 13 institutions and departments paid a $250 fee for table space to promote their graduate programs to the undergraduate students at the session, providing $3,250 to help cover the session costs. Students and departments came 30 minutes early to allow uninterrupted time for the departmental representatives to discuss their graduate opportunities with the students. In addition, the APS Membership Office had a table to promote membership to the students.

As the number of students grows, the probability increases that some students may not be visited by any APS members or other EB attendees. This is especially the case for AAA posters. To
better increase the interaction of all poster presenters with APS faculty and trainees, the committee will print out three sets of numbers from 1-175 (or whatever the maximum number of boards is) and have staff and committee members distribute one or two numbers to each APS member as they arrive. Each member will be asked to stop by the numbered poster. This should decrease the likelihood that a student does not have any visitors.

Figure 1: Undergraduate Poster Session
Presenters, 2004-2014

V. APS Frontiers in Physiology Professional Development Program for Teachers
A. Background: The original APS Frontiers in Physiology Summer Research for Teachers program was established in 1990. It provided year-long fellowships for middle and high school science teachers from across the nation, engaging them in biomedical research, building connections with researchers, improving their teaching methods and curricular materials, and deepening the understanding of both teachers and students of how biomedical research is done and how animals are used in research. Funding has been provided by the APS, NIH, and NSF. APS members show strong support for the program. They not only volunteer to host teachers in their laboratories but also provide the needed lab materials and supplies for each teacher's research and, often, provide part of the stipend and travel costs for the teacher. The program has been extensively evaluated over its long history. It consistently has strong positive effects on the teaching methods used by teachers (that is, selecting more student-centered methods that build research and investigative skills), the networks built between and among teachers and researchers, and teacher perceptions of the value of biomedical research and the need for using animal models in research. In 2010-2011, a pilot Frontiers Online Teacher Program was conducted. This was a year-long online-only modification of the comprehensive Frontiers Research Teacher Fellowship using material from the traditional summer research fellowship experience. The teachers met for the first time at EB 2011 in Washington, DC, and participated in various APS Education Office and Committee activities. This one-year modification of the traditional APS summer research program served two purposes: 1) It facilitated an explicit evaluation of the impact of a physiology laboratory experience for teacher fellows in the program; and 2) It developed a new model to allow APS to reach out to more teachers via online professional development.

B. Update: The comparative study of the online and comprehensive programs showed that the pedagogy skills learned at the Science Teaching Forum could be effectively taught online.
However, teachers who did not have the summer research experience did not gain the in depth knowledge of the processes of basic research as did teachers who only did an online unit about basic and clinical research. Thus the 2012-2013 and the 2013-2014 teachers participated in the comprehensive Frontiers in Physiology Summer Research Teacher Fellowship, including the laboratory experience and online professional development but not the week-long Science Teaching Forum workshop.

From a pool of 37 applicants, the Education Committee selected 17 teacher fellows to participate in this program (46% award rate); awardees are listed in (Table 9). These awardees completed their fellowship by participating in EB 2014 in San Diego, CA.

### Table 9: Frontiers in Physiology 2013-2014 Research Teachers and Hosts

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Research Host</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rebecca Burns, Sherwood Githens MS, Durham, NC</td>
<td>Mildred Pointer, North Carolina Central, Durham, NC</td>
</tr>
<tr>
<td>Rachelle Carnes, Century HS, Hillsboro, OR</td>
<td>Virginia Brooks, Oregon Health Sciences, Portland</td>
</tr>
<tr>
<td>Matthew Carter, Riverdale HS, Fresno, CA</td>
<td>Rudy Ortiz, UC Merced, Merced, CA</td>
</tr>
<tr>
<td>Ginger Donnelly, Fontana Unified School District- JHHS, Fontana, CA</td>
<td>Lawrence Longo, Loma Linda University, Loma Linda, CA</td>
</tr>
<tr>
<td>Steve Farmer, Mt. Vernon HS, Mt. Vernon, OH</td>
<td>Dr. Loren Wold, The Research Institute at Nationwide Children's Hospital/ Ohio State University, Columbus, OH</td>
</tr>
<tr>
<td>Melissa Faucheux, St John the Baptist Parish School System Lake Pontchartrain Elem., LaPlace, LA</td>
<td>Nicholas Gilpin, LSU Health Science Center, New Orleans, LA</td>
</tr>
<tr>
<td>Lorenita Holloway, Compton HS, Compton, CA</td>
<td>Nina Bradley, UCLA</td>
</tr>
<tr>
<td>Lauren Luongo, Milton Hershey School, Hershey, PA</td>
<td>Leonard Jefferson, Penn State College of Medicine, Hershey, PA</td>
</tr>
<tr>
<td>Patricia Moser, Clarksburg HS, Clarksburg, MD</td>
<td>Margery Anderson, Walter Reed Medical, Silver Spring, MD</td>
</tr>
<tr>
<td>Andrew Nelson, San Diego Unified School District, San Diego, CA</td>
<td>Thomas Herzig, US Navy Health Science Center, San Diego, CA</td>
</tr>
<tr>
<td>Susan Nierenberg, Randallstown HS, Randallstown, MD</td>
<td>Andrew Wolfe, Johns Hopkins Medical Institute, Baltimore, MD</td>
</tr>
<tr>
<td>Elizabeth Pitts, Fort Worth ISD, Ft. Worth, TX</td>
<td>Dana Garcia, Texas State University of San Marcos</td>
</tr>
<tr>
<td>Takisha Reece, Sandy Spring Friends School, Sandy Spring, MD</td>
<td>Steven Farber, Carnegie Institution for Science, Baltimore, MD</td>
</tr>
<tr>
<td>Christina Sabato, Pike HS, Indianapolis, IN</td>
<td>Steve Miller, IU School of Medicine, Indianapolis</td>
</tr>
<tr>
<td>Tamica Stubbs, Phillip O Berry Academy of Technology HS, Charlotte, NC</td>
<td>Inna Sokolova, UNCC, Charlotte, NC</td>
</tr>
<tr>
<td>Gema Suarez, Anaheim HS, Anaheim, CA</td>
<td>Sean Wilson, Loma Linda Univ School of Med., Loma Linda, CA</td>
</tr>
<tr>
<td>Temy Taylor, Diamond Ranch HS, Pamona, CA</td>
<td>Bradley Andersen, Western University of Health Sciences, Pomona, CA</td>
</tr>
</tbody>
</table>
The Committee thanks former Frontiers Research Teachers Monica Erwin (PA), Tonya Smith (SC), Rebecca Evans (OH), Charles Geach (TX) and Robert Manriquez (LA) for assisting the Committee in the review process.

For 2013-2014, from a pool of 19 applications, the Education Committee selected 13 teacher fellows to participate in this program; awardees are listed in the table below. These awardees are working in the lab now and will complete their fellowship by participating in EB 2015 in Boston.

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Host</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jason Ambler</td>
<td>R. Alberto Travagli</td>
</tr>
<tr>
<td>Hershey HS, Hershey, PA</td>
<td>Penn State-College of Medicine</td>
</tr>
<tr>
<td>Amy Anderson</td>
<td>Layla Al-Nakkash</td>
</tr>
<tr>
<td>BASIS Phoenix, Phoenix, AZ</td>
<td>Midwestern University</td>
</tr>
<tr>
<td>Shannon Bair</td>
<td>Alan R. Hargens</td>
</tr>
<tr>
<td>The Preuss School UCSD, San Diego, CA</td>
<td>University of California, San Diego</td>
</tr>
<tr>
<td>Brandy Cahoon</td>
<td>Frank van Breukelen</td>
</tr>
<tr>
<td>Clark County School District, Las Vegas, NV</td>
<td>University of Nevada, Las Vegas</td>
</tr>
<tr>
<td>Katahdin Cook Whitt</td>
<td>David Goldstein</td>
</tr>
<tr>
<td>Dayton Regional STEM School, Kettering, OH</td>
<td>Wright State University</td>
</tr>
<tr>
<td>Barbara Gafford-Hampton</td>
<td>Jeff Sands and Janet D. Klein</td>
</tr>
<tr>
<td>Miller Grove HS, Lithonia, GA</td>
<td>Emory University</td>
</tr>
<tr>
<td>Aaron McCalister</td>
<td>Jason Gardner</td>
</tr>
<tr>
<td>John Quincy Adams MS, Metairie, LA</td>
<td>Louisiana State University</td>
</tr>
<tr>
<td>June Miller</td>
<td>Andrew Lovering</td>
</tr>
<tr>
<td>Marist Catholic HS, Eugene, OR</td>
<td>University of Oregon</td>
</tr>
<tr>
<td>Richard Phillips</td>
<td>Liz Simon and Flavia Souza-Smith</td>
</tr>
<tr>
<td>Jefferson Parish School Board, Slidell, LA</td>
<td>Louisiana Health Sci Univ, New Orleans</td>
</tr>
<tr>
<td>Kathleen Stewart</td>
<td>Nicholas W. Gilpin</td>
</tr>
<tr>
<td>Garrett MS, Austell, GA</td>
<td>Louisiana Health Sci Univ, New Orleans</td>
</tr>
<tr>
<td>Robert Stewart</td>
<td>Jennifer Gooch</td>
</tr>
<tr>
<td>Coan MS, Smyrna, GA</td>
<td>Philadelphia College of Osteopathic Medicine</td>
</tr>
<tr>
<td>Scott Troy</td>
<td>Rodger Kram</td>
</tr>
<tr>
<td>Westminster HS, Westminster, CO</td>
<td>University of Colorado Boulder</td>
</tr>
<tr>
<td>John Ward</td>
<td>Jennifer Gooch</td>
</tr>
<tr>
<td>North Clayton HS, Atlanta, GA</td>
<td>Philadelphia College of Osteopathic Medicine</td>
</tr>
</tbody>
</table>

The Committee thanks former Frontiers Research Teachers Robert Manriquez, Tonya Smith, Rebecca Evans, and Monica Erwin for assisting the Committee in the review process, the class mentoring and the Frontiers activities at EB 2014.

The Committee greatly appreciates the funding by which Council has supported the Frontiers program during the hiatus in federal funding. We are very grateful for the new NIH SEPA funding support of this program and the continued support and encouragement of the Council for this program. The Committee notes that this SEPA funding is also related to Strategic 1. The Committee thanks the APS staff (especially Rebecca Osthus) and our Frontiers teachers and APS research hosts for their aggressive partnering in our successful efforts to gain strong congressional support for the SEPA and OSE programs.

VI. 2014 EB Workshop for Teachers and Students

**Background:** The APS holds a workshop for local high school teachers and students during EB each year. The workshop includes a keynote speaker, career panel, lunch and tours of exhibits and posters with physiologists and workshops in the afternoon for both teachers and students.
Keynote talks are recorded and shared via the Archive and APS website along with related teaching materials.

**Update:** Education Committee member RK Rao coordinated the 2014 APS Workshop for High School Teachers and Students at EB. This year’s EB workshop had one of the highest attendance numbers we have had in a while with 120 area high school teachers and their students in attendance at the workshop on April 28, along with APS members and 2013-2014 Frontiers Research Teachers.

As students arrived, they were engaged in interactive demonstrations by APS members, K-12 Outreach Fellows, and representatives from ADInstruments, who set up examples of equipment used in teaching and research laboratories. The keynote talk: “Rattlesnakes, hummingbirds, and antelopes: Biological insights from nature’s extremes” was given by Stan Lindstedt, Ph.D., Professor of Physiology, School of Medicine, University of Arizona, and Regents’ Professor of Biology, Northern Arizona University, Flagstaff, AZ. His talk was followed by a Careers Panel that included Lindstedt along with Raisa Loucil-Alicea and Abigail Ruiz-Rivera this year’s Minority Outreach Fellows. The panel was moderated by 2013 Lead Mentor Instructor, Robert Manriquez. Sixteen APS members served as tour guides during lunch where they took teachers and students through the exhibits and posters and shared a box lunch while discussing physiology careers.

The afternoon student session was led by Carissa Krane, University of Dayton, along with Frontiers Mentor Instructors Robert Manriquez and Monica Erwin. Students used the “Junkyard Digestion” activity on modeling the digestive system with common household items, while their teachers and APS teacher fellows conducted “Using the Next Generation Science Standards” an exercise in using student centered activities in your classroom led by Tonya Smith, Frontiers Mentor Teacher. As in the past, feedback from both teachers and students was very positive and students were especially excited to meet physiologists one-on-one.

VII. Physiology Understanding Week

**A. Background:** The primary objective of Physiology Understanding (PhUn) Week is to increase student interest in and understanding of physiology in their lives and to introduce them to physiology as a possible career. Each November, APS members are encouraged to visit their local school(s), explain what physiology is and what a physiologist does, and lead students in interactive learning activities. The program was piloted in 2005-2006 and launched as a national program in 2007. The PhUn Week website (www.phunweek.org) provides extensive information on the program.

**B. Update:** In 2013, more than 14,000 students were reached at 83 event sites across the nation and Puerto Rico (Fig. 2). This effort involved 62 APS member Lead Coordinators and a total of 478 scientists presenting and partnering with 351 classroom teachers and educators. The program exceeded its 2013 goal with outreach to 14,732 students (Fig. 3). Distribution by grades included nearly 26% in high school classrooms, 55% in primary and elementary classrooms, and 25% in middle school classrooms. The number of physiologists (478), teachers (351), and event sites (83) all exceeded projected goals. The Committee is particularly excited about the large increase in the participation of physiologists in PhUn Week events.

To increase the visibility and recognition of this excellent public outreach program, the Committee and staff are finalizing a mechanism to recognize participants who have completed 5 and 10 years of participation in PhUn week. Certificates for 5/10 year participation will be presented at EB 2015 (the 10th anniversary of PhUn week). The Committee suggests that the 5 and 10 year
recipients be recognized at the APS Business Meeting in the Award booklet and/or the slide presentation. Education and Marketing staff members are working on promotional materials to celebrate the 10th anniversary of PhUn Week.

**Action Item 2, Education Committee:** The committee requests that the 5 and 10 year PhUn Week participants be recognized at the APS Business Meeting.
VIII. PhUn Week Training Session at Experimental Biology:

**Background:** This EB session leverages the success of PhUn Week by providing a forum for the exchange of ideas and experiences with the program. A core goal of the session remains the training of members interested in participation in the program. The session is formatted as a brief plenary overview and an interactive poster session.

**Update:** In 2014, the session drew around 100 attendees, including physiologists and teachers. Kim Huey directed the session in which members (including graduate/postdoctoral trainees) presented 23 posters at the training session. ADInstruments continued its tradition of sponsoring a continental breakfast.

IX. International Science and Engineering Fair (ISEF)

**A. Background:** Since 1992 the APS has presented awards to high school students presenting physiology research projects at the International Science and Engineering Fair (ISEF). Sponsored by Intel, the ISEF is the world’s largest international pre-college science competition and annually provides a forum for thousands of high school students from many countries to showcase their independent research. Each year, millions of students worldwide compete in local and school-sponsored science fairs; the winners of these events go on to participate in Intel ISEF-affiliated regional and state fairs from which the best win the opportunity to attend the Intel ISEF.

**B. Update:** APS science awards were again presented to high school students at the 65th ISEF, which provided an opportunity for the 2014 APS Award judges to meet some of the brightest young minds in the world. The Intel ISEF, was held this year in Los Angeles, California on May 11-16, 2014. More than 1,700 students presented their own independent research and competed for over 5 million dollars in scholarships and cash prizes. For the 22nd year, the APS presented Special Awards for the most outstanding projects in the physiological sciences in the form of cash prizes, certificates, t-shirts, and one-year subscriptions to APS publications. This year's APS judging team included Lila LaGrange (Chair; University of the Incarnate World), Johana Vallejo-Elias (Co-Chair; Midwestern University), Kim Henige (California State University, Northridge), Erica Dale (University of California, Los Angeles), and Oliver Losón (California Institute of Technology). The APS judging team evaluated 75 projects based on students' abstracts and selected 22 candidates to interview at their posters. After two days of judging, the following students were selected to receive APS Awards for excellence in physiological research:

- The first place APS award ($1,500) was presented to Divya Koyyalagunta from Clear Lake High School (Houston, Texas)
- The second place APS award ($1,000) was presented to Sanjana Rane from DuPont Manual High School (Louisville, Kentucky)
- The third place APS award ($500) was won by Garrett Elijah McGrady from DuPont Manual High School
- The APS Exceptional Science Award ($500) was won by Giuseppe Dall’Agnese from Liceo Scientifico E. Vendramini (Pordenone, Italy). Giuseppe is our first international winner.
X. Clever Catch Balls

A. Background: The APS Human Physiology Clever Catch Ball was developed by the Education Committee and field-tested at the 2010 USA Science and Engineering Festival in Washington, DC. This prototype was subsequently revised, and the final version is now available for purchase at the APS Store. The Clever Catch Ball is a tool for teaching physiology, primarily in grades 10-12 and at the undergraduate level. Typically, students toss the ball to each other, answering the question underneath or closest to their left thumb. The Education Office distributes the balls to teachers at workshops and through fellowship programs; they are very popular. The APS Marketing Department handles sales of the balls through the APS website and at exhibits at conferences. The balls are a great visual at the exhibits and are one of their most popular items for sale.

B. Update: Council approved development and distribution of a new ball for primary/middle school (4th-7th grades) for use in classrooms and especially during PhUn Week activities. A list of age appropriate questions was developed and reviewed by teachers. Staff worked with a vendor on developing the artwork for the project and for having the ball printed. The new Elementary Clever Catch Ball has been produced and is ready for distribution during the APS Conferences (including the Institute on Teaching and Learning), EB and PhUn Week.

XI. Collaboration with Animal Care and Use Committee on HS/Undergrad Materials
ACE is developing materials for high school and undergraduate use on the use of animals in drug development. Education Committee members have volunteered to work with ACE on this project.

XII. Undergraduate Program Recognition Project
The Education Committee is continuing its exploration into the possibility of recognizing undergraduate programs in physiology that serve as exemplars in preparing students for physiology careers. A subcommittee is gathering information for discussion at the fall committee meeting.

Closing remarks:
The APS Education Committee thanks APS Council and members for their continued support of these programs that are expanding physiology education, the pipeline to physiology careers and the development of physiology researchers. The APS education activities would be impossible without the expert leadership of Marsha Lakes Matyas and her outstanding professional staff in the APS Education Office, including Brooke Bruthers, Margaret Shain Stieben, Miranda Byse, and Melinda Lowy. Their experience, talent and tireless work for the Society are greatly appreciated.

Finally, at the fall meeting, the committee will consider methods to better engage all members in the EB activities so as to better present these. We will also discuss whether the Committee needs to break into two committees or two subcommittees to accomplish its work more efficiently, as discussed by Council.

Respectfully submitted,
J. Michael Wyss, Chair
June 24, 2014
## Appendix A: 2014 David S. Bruce Outstanding Undergraduate Abstract Awardees

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Research Host</th>
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<tbody>
<tr>
<td>Aw, Mun Y.</td>
<td>University of Arizona</td>
<td>Thomas L. Pannabecker, Ph.D.</td>
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<tr>
<td>Backes, Iara M.</td>
<td>University of Florida</td>
<td>Deborah A. Scheuer, Ph.D.</td>
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<td>Catanzaro, Michael F.</td>
<td>University of Pittsburgh</td>
<td>Bill J. Yates, Ph.D.</td>
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<td>Dong, Frederick</td>
<td>Cornell University</td>
<td>Robin L. Davisson, Ph.D.</td>
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<td>Ferland, David</td>
<td>Michigan State University</td>
<td>Stephanie W. Watts, Ph.D.</td>
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<td>Frazier, Rebecca</td>
<td>Susquehanna University</td>
<td>Erin M. Keen-Rhinehart, Ph.D.</td>
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<td>Gonzalez, Eileen R.</td>
<td>California State Univ., Los Angeles</td>
<td>Katrina G. Yamazaki, D.Phil.</td>
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<tr>
<td>Horwath, Julie A.</td>
<td>Cornell University</td>
<td>Robin L. Davisson, Ph.D.</td>
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<td>Johnson, Sarah M.</td>
<td>University of Oregon</td>
<td>Jeffrey S. Gilbert, Ph.D.</td>
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<td>Kleinertz, Aaron M.</td>
<td>University of Wisconsin-Madison</td>
<td>Melissa L. Bates, Ph.D.</td>
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<td>Korn, Michael</td>
<td>Kalamazoo College</td>
<td>Christopher L. Mendias, Ph.D.</td>
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<td>Kruse, Sarah M.</td>
<td>Mayo Clinic</td>
<td>Jill N. Barnes, Ph.D.</td>
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<td>Laws, Maxwell T.</td>
<td>Wayne State University</td>
<td>Patrick J. Mueller, Ph.D.</td>
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<td>Lee, Debby</td>
<td>University of California, Merced</td>
<td>Rudy M. Ortiz, Ph.D.</td>
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<td>Mack, Jacob</td>
<td>University of California, Davis</td>
<td>Barbara A. Horwitz, Ph.D.</td>
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<td>Malins, Kevin J.</td>
<td>University of California, Davis</td>
<td>John M. Horowitz, Ph.D.</td>
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<tr>
<td>Mikhailova, Alexandra</td>
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<td>Barbara A. Horwitz, Ph.D.</td>
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<td>Ondek, Katelynn</td>
<td>Susquehanna University</td>
<td>Erin M. Keen-Rhinehart, Ph.D.</td>
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<td>Opacich, Jonathan W.</td>
<td>University of Minnesota, Duluth</td>
<td>Jean F. Regal, Ph.D.</td>
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<tr>
<td>Peterson, Jenna M.</td>
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<td>Jean F. Regal, Ph.D.</td>
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<td>Poinsatte, Katherine M.</td>
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<td>Ann M. Stowe, Ph.D.</td>
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<td>Savarese, Mary</td>
<td>Elon University</td>
<td>Jennifer K. Uno, Ph.D.</td>
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<td>Shuster, Taylor T.</td>
<td>University of Wisconsin-Madison</td>
<td>Marlowe W. Eldridge, Ph.D.</td>
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<td>Skolka, Michael P.</td>
<td>Messiah College</td>
<td>R. Alberto Travagl, Ph.D.</td>
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<td>Small, Alissa L.</td>
<td>University of Wisconsin-Madison</td>
<td>Jyoti J. Watters, Ph.D.</td>
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<td>Tank, Ericka M.</td>
<td>University of Iowa</td>
<td>Gary L. Pierce, Ph.D.</td>
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<td>Tosto, Jenna</td>
<td>William Paterson Univ. of New Jersey</td>
<td>Jorge M. Serrador, Ph.D.</td>
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<td>Trisko, Breanna M.</td>
<td>University of California, San Diego</td>
<td>Ellen C. Breen, Ph.D.</td>
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<tr>
<td>Weidemann, Benjamin J.</td>
<td>University of Iowa</td>
<td>Justin L. Grobe, Ph.D.</td>
</tr>
<tr>
<td>York, Julia</td>
<td>University of British Columbia</td>
<td>William K. Milsom, Ph.D.</td>
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Appendix B: Becoming an Effective Teacher PST Course Information

APS Professional Skills Training Course:
Becoming an Effective Teacher – Blended Version

COURSE CREDIT: 3 graduate credits (Adams State University approved)

DATES & TIMES:  Part 1: Online Component  April 1-June 20, 2014
(Students must commit to spending a minimum of 2 hours per week during this 12-week period to completing course requirements)

Part 2: In-Person Component
6:30-9pm, Monday, June 23, 2014 (2.5 hours)
9:00am-5:30pm, Tuesday, June 24, 2014 (7.5 hours)
9:00am-5:30pm, Wednesday, June 25, 2014 (7.5 hours)
9:00am-5:00pm, Thursday, June 26, 2014 (7 hours)
9:00am-12:00pm, Friday, June 27, 2014 (3 hours)

Part 3: Online Component  July 1-August 29, 2014
(Students must commit to spending a minimum of 10 hours completing online post-assignments)

61.5 hours total

COURSE DESCRIPTION:
This professional development course is designed for upper level graduate students, postdoctoral fellows, and early career faculty who want to learn how to teach effectively. Participants will focus on 1) developing skills as and modeling being an effective teacher, including the creation, evaluation, and revision of a teaching philosophy, teaching portfolio, and micro-teach; 2) identifying and distinguishing between the different means by which people learn; 3) creating a short- and long-term plan to develop and expand their teaching credentials; 4) describing and demonstrating methods for teaching students from diverse groups; 5) understanding the process involved in creating a lesson vs. a course; and 6) identifying professional standards of practice in teaching.

LEARNING OUTCOMES:
After completing this course successfully, participants will be able to:
• Develop a teaching philosophy that includes the necessary elements and accurately summarizes their goals as an educator.
• Develop a teaching portfolio that reflects their current status and short- and long-term goals as an educator.
• Describe Family Educational Rights and Privacy Act (FERPA) regulations and explain how they affect teachers and students in and out of the classroom.
• Describe metacognition and major learning theories and explain how they affect teaching and learning.
• Distinguish among varying learning preferences and explain how to incorporate effective pedagogy for each into existing lessons.
• List a wide variety of teaching modalities, including use of technology, and compare/contrast their strengths and weaknesses as they relate to learning preferences.
• Define the types of diversity present in a student population and explain the ramifications of each on teaching and learning.
• Recognize the steps in backward curriculum design and how they apply to the
• Use backward design to write learning objectives for a micro-teach that represent both lower and higher Bloom's levels.
• Distinguish between types of assessment, the use and value of each and how they interact with learning preferences.
• List the advantages and disadvantages of active and passive learning and describe how traditional passive learning methods can be made more active (student-centered).
• Identify a variety of active learning strategies and give an example of where each could be used.
• Describe the benefits of using student research as pedagogy, and identify different models used to incorporate it into courses.
• Create and video record a micro-teach that demonstrates their efficacy as an educator: 1) incorporating objectives at multiple Bloom’s levels, 2) addressing multiple student learning preferences, 3) incorporating multiple active learning methods, and 4) utilizing assessment techniques appropriate to the learning objectives.
• Identify resources and materials that can further assist in the development of teaching skills.

TEXTS, READINGS, INSTRUCTIONAL RESOURCES:

Provided Readings:

- American Association for the Advancement of Science (2011). *Vision and Change in Undergraduate Biology Education. A Call to Action.*
- Fisher, B. (2011) *Writing a Teaching Philosophy Statement.* http://teachingcenter.wustl.edu/About/ProgramsforGraduateStudentsandPostdocs/resources/Pages/Writing-a-Teaching-Philosophy-Statement.aspx#heading_1
- Univ. of Southern California. (1999) *Teaching in a Diverse Classroom.* http://cet.usc.edu/resources/teaching_learning/docs/teaching_nuggets_docs/2.8_Teaching_in_a_Diverse_Classroom.pdf
Supplemental Texts:
  http://cft.vanderbilt.edu/teaching-guides/reflecting/teaching-portfolios/
  https://www.cmu.edu/teaching/assessment/
  http://www.edudemic.com/a-simple-guide-to-4-complex-learning-theories/
- Lang, J. (2010) *4 Steps to a Memorable Teaching Philosophy.*
  http://chronicle.com/article/5-Steps-to-a-Memorable/124199/
- Study Guides & Strategies. *Active Learning.* http://www.studygs.net/activelearn.htm

COURSE REQUIREMENTS:
1. Complete all online pre- and post-workshop readings and assignments.
2. Review all draft and final teaching philosophies, teaching portfolios, and micro-teach sessions in the assigned course small group and provide written critique of them.
3. Attend and actively participate in all sessions and discussions during the in-person portion.
4. Thoughtfully complete all worksheets, case studies and other activities during the in-person portion.
5. Maintain professional behavior during discussions, especially in regard to critiquing other students’ work and with respect to other students’ comments during both the online and in-person portions of the course.
6. Thoughtfully complete the pre-course and post-course assessments.

GRADE DISTRIBUTION:
- Attendance and Participation 5%
- Teaching Philosophy – Final 10%
- Teaching Portfolio – Final 10%
- Micro-teach Assignment 25%
- Course Assessments 25%
- Course Assignments 25%
  (worksheets, critiques, case studies)
- Total 100%

GRADE SCALE:
- 90-100% A
- 80-89% B
- 70-79% C
- 60-69% D
- 59 and below F
COURSE SCHEDULE:

PART 1: ONLINE COMPONENT WORK

Friday, April 11, 2014
Assignments to Complete Online by Today:
Complete Pre-Course activities, including pre-test, critiquing a video lesson, case study on diversity issues, and worksheet on teaching terminology (2 hours)

Monday, April 14, 2014
Assignments to Complete Online by Today:
Read articles on why and how to write a teaching philosophy
Submit a draft Teaching Philosophy Worksheet (2 hours)
Receive feedback from instructor (April 14-17)

Monday, April 21, 2014
Assignments to Complete Online by Today:
Read articles on developing a teaching portfolio
Submit a draft teaching portfolio with current and planned activities
Receive feedback from instructor (April 21-23)

Friday, April 25, 2014
Assignments to Complete Online by Today:
Submit revised teaching philosophy and teaching portfolio.
Read and discuss group members’ revised teaching philosophies (2 hours)

Friday, May 2, 2014
Assignments to Complete Online by Today:
Read the FERPA regulations
Submit the Professional Standards of Practice Worksheet and case study response
Discuss case study with students and instructor on the discussion board (2 hours)

Friday, May 9, 2014
Assignments to Complete Online by Today:
Read articles on learning theories and metacognition
Submit 3 questions about how people learn for discussion at the in-person session
Submit 1 paragraph reflection on “how I learn best” and comment on others (2 hours)

Friday, May 16, 2014
Assignments to Complete Online by Today:
Take learning preference quiz and compare results to your reflection (0.5 hour)
Read article on adapting teaching to learning preferences
Post your learning preference and discuss on the discussion board how it does or does not match how you best learn (1.5 hours)

Friday, May 23, 2014
Assignments to Complete Online by Today:
Read article on various types of diversity faced in classrooms today
Submit worksheet listing resources available to you at your institution for dealing with diverse students (1 hour)
Compare your list and discuss with instructor and students on the discussion board and note places where you need to look further (1 hour)
Friday, May 30, 2014
Assignments to Complete Online by Today:
Read book chapter on backward design
Read article on evidence-based teaching
Write draft “email” to a colleague explaining why evidence-based teaching is important
Submit Outline 2-3 questions you have about backward design and evidence-based teaching for discussion at the in-person session (2 hours)

Friday, June 6, 2014
Assignments to Complete Online by Today:
Read article on Bloom’s taxonomy
Rewrite sample objectives to a higher level of Bloom’s Taxonomy and post on discussion board (1 hour)
Critique group members’ rewritten objectives
Read instructor critiques of those objectives (1 hour)

Friday, June 13, 2014
Assignments to Complete Online by Today:
Read articles on types of assessment
Take the self-quiz and use the rubric to grade a lab report (1 hour)
Compare your grading with those others in your group and with your instructor’s grading and discuss on the discussion board (1 hour)

Friday, June 20, 2014
Assignments to Complete Online by Today:
Read article on active vs. passive learning
Complete worksheet on active and passive teaching methods (including transforming 2 passive activities in to active ones, post on discussion board, and discuss with instructor (2 hours)

PART 2: IN-PERSON COMPONENT WORK
Monday, June 23, 2014
4:30 – 5:30 pm Orientation Session:
Introductions of staff, students, instructors
Review of course goals & objectives
Overview of course schedule and post-course assignments
Review of student expectations
5:30 – 6:30 pm Dinner
6:30 – 8:00 pm Opening reception
8:00 – 9:30 pm One Lesson. . . 3 Ways Activity
  1) Lecture and worksheet
  2) Lecture and cookbook handout
  3) Inquiry and lecture
Debrief
Tuesday, June 24, 2014
7:30 – 8:30 am  Breakfast
8:45 – 9:00 am  Announcements
9:00 – 10:00 am  Teaching Credentials and Professional Standards Practice
  Teaching at diverse institutions mini-talks
  FERPA think-pair-share activities
  Q&A from pre-course work and in-person session
10:00 – 10:30 am  How People Learn
  Diversity among students presentation
  How people learn discussion
10:30 – 11:00 am  Networking Break
11:00 am – 12:00 pm  How People Learn – cont’d
  Ways to learn – discussion modalities
  Q&A from pre-course work and in-person session
  Generating a list of teaching modalities (including technology modalities)
12:00 – 1:00 pm  Lunch
1:00 – 2:00 pm  Networking break
2:30 – 3:30 pm  Final Project – Micro-teach
  Demonstration and debrief
  Overview of Micro-teach Assignment
3:30 – 4:00 pm  Micro-teach Think-Pair-Share
  Small group activity to draft topic for micro-teach, outline student diversity in classroom,
  and 3 modalities that might be used in micro-teach
4:00 – 5:00 pm  Work on Micro-teach
  Finalize topic, student diversity and level, modalities to be used
  Meeting one-on-one with instructor
  Begin drafting learning objectives for micro-teach
5:30 – 6:30  Dinner

Wednesday, June 25, 2014
7:30 – 8:30 am  Breakfast
8:45 – 9:00 am  Announcements
9:00 – 9:30 am  Micro-teach Q&A Session
9:30 – 10:30 am  Backwards Design/Scientific Teaching
  Demonstration and presentation
  Small group discussion on Guest Lecturer Jeopardy exercise and modalities vs.
  learning objectives
  Round 2 of Guest Lecturer Jeopardy – focus on learning objectives
10:30 – 11:00 am  Networking Break
11:00 am – 12:00 pm  Learning Objectives and Bloom’s Taxonomy
  Review presentation
  Changing Guest Teacher Challenge learning objectives to increase
  Bloom’s level
  Discussion of changes in teaching method to match increased level
12:00 – 1:00 pm  Lunch
1:00 – 2:00 pm  Small group work: Writing learning objectives for micro-teach
  Draft 3 learning objectives
  Assign Bloom’s taxonomy – must be at 3 different levels
Present learning objectives in small group and discuss

2:00 – 2:30 pm **Networking break**
2:30 – 3:00 pm Small group work continued
3:00 – 5:00 pm **Finalize micro-teach**
   - Topic
   - Student group characterization
   - Learning objectives
   - Review one-on-one with instructor and revise as needed
   - *Worksheet assignment for micro-teach due at end of session*

5:00 – 5:30 pm Small group work
   - Begin drafting assessment ideas for micro-teach
   - Begin drafting activity ideas for micro-teach

5:30 – 6:30 **Dinner**

**Thursday, June 26, 2014**

7:30 – 8:30 am **Breakfast**
8:45 – 9:00 am **Announcements**
9:00 – 9:30 am **Micro-teach demonstration and debrief**
9:30 – 10:30 am **Assessment**
   - Review presentation
   - Q&A from pre-course work and in-person session

10:30 – 11:00 am **Networking Break**

11:00 am – 12:00 pm Small group work
   - Discuss assessment ideas for micro-teach
   - Finalize assessment plans for micro-teach

12:00 – 1:00 pm **Lunch**

1:00 – 2:00 pm **Active Learning (student-centered vs. teacher-centered)**
   - Review presentation
   - Q&A from pre-course work and in-person session

2:00 – 2:30 pm **Networking break**
2:30 – 5:00 pm Small Group work
   - Finish outline of micro-teach
   - Review one-on-one with instructor
   - Prepare planner for presentation on Friday

5:30 – 6:30 **Dinner**

**Friday June 27, 2014**

7:30 – 8:30 am **Breakfast**
8:45 – 9:00 am **Announcements**
9:00 – 11:30 am Micro-teach: Presentations of plans by students and discussion
11:30 am – 12:00 pm Post-course work - next steps
   - In-person course evaluation
PART 3: ONLINE COMPONENT WORK

Friday, July 11, 2014
Assignments to Complete Online by Today:
Submit final version of teaching philosophy
Receive final feedback from instructor
Submit final micro-teach lesson plan

Friday, July 25, 2014
Assignments to Complete Online by Today:
Submit final version of teaching portfolio
Receive final feedback from instructor
Submit final micro-teach implementation plan

Friday, August 8, 2014
Assignments to Complete Online by Today:
Submit Microteach video or observation sheet, student products, and final learning objectives and assessment tool(s)
Discuss with instructor

Friday, August 22, 2014
Assignments to Complete Online by Today:
Review group members' Micro-teach videos
Suggest edits/provide comments on each and review instructor feedback

Friday, August 29, 2014
Assignments to Complete Online by Today:
Submit Exit Survey
Complete post-course test, including
  - Critiquing a video lesson
  - Case study on diversity issues
  - Backward design case study
  - General knowledge questions