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 Early Career Innovative Educator Award

**Background:** This award was established in 2011 to honor an APS member 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.

**2015 Update:** The Education Committee received 4 applications for 2015. 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 Trevor Day of Mount Royal University, Calgary, Canada, as the 2015 awardee. His application included a description of a building and utilizing an integrated tilt table-lower body negative pressure apparatus for use in undergraduate laboratory projects. This apparatus will be integrated in the undergraduate curriculum through formal courses with laboratory projects, independent project courses and summer research projects with paid and volunteer students. It can be modified to address new questions with new groups of students as needed. Dr. Day attended EB 2015 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, APS has posted links to speakers’ presentations on the APS website. Since 2006, presentations also have been available as Flash files with both audio and visuals (slides). Beginning in 2015, presentations will be available as video files. 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.

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 most 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.

2015 Update: The resources from the Refresher Courses are viewed regularly at the APS website and, more importantly, have been downloaded nearly 24,000 times at the LifeSciTRC and have been saved by users to their folders 330 times. 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. The presentations are now available on the APS website¹ and through the LifeSciTRC.

We are excited about the success of the 2015 Refresher Course “It's All in Your Head - A Refresher Course on the Brain and Systems Control.” The course was organized by Catharine Clark (lead) and David Rodenbaugh. Consistent with previous years, the sessions were very well-attended (~300 attendees). Most speakers were very focused on the task of informing the audience about those areas which impact the educational mission of the educators. Organizers will continue to emphasize to speakers that the session must focus on an update of the area of interest and not be a summary of one person’s research and especially not include unpublished data. Nearly a third of the audience members (N=86) responded to the feedback survey. The audiences rating on the perceived usefulness of each speaker’s presentation indicated that the session excellently met the audience’s expectations (Table 2). Overall ratings were very high.

Table 2: 2015 Refresher Course Mean Usefulness Ratings

<table>
<thead>
<tr>
<th>Program Component</th>
<th>Rating*</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Brain and the Cardiovascular System</td>
<td></td>
</tr>
<tr>
<td>Roger Dampney, Ph.D., University of Sydney</td>
<td>4.3</td>
</tr>
<tr>
<td>The Brain and the Immune System</td>
<td></td>
</tr>
<tr>
<td>Francois Abboud, M.D., University of Iowa</td>
<td>4.0</td>
</tr>
<tr>
<td>The Brain and the Respiratory System</td>
<td></td>
</tr>
<tr>
<td>Gordon Mitchell, Ph.D., University of Florida</td>
<td>4.6</td>
</tr>
<tr>
<td>The Brain in the Gut</td>
<td></td>
</tr>
<tr>
<td>Gary Mawe, Ph.D., University of Vermont</td>
<td>4.6</td>
</tr>
<tr>
<td>OVERALL PROGRAM RATING</td>
<td>4.6</td>
</tr>
</tbody>
</table>

*On a scale of 1 (Not at all useful) to 5 (Very useful)

Table 3: 2015 Refresher Course Student Participant Demographics

<table>
<thead>
<tr>
<th>Training Level</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate student</td>
<td>5</td>
</tr>
<tr>
<td>Graduate student</td>
<td>26</td>
</tr>
<tr>
<td>Medical/professional student</td>
<td>0</td>
</tr>
<tr>
<td>Postdoc</td>
<td>9</td>
</tr>
</tbody>
</table>

¹ http://www.the-aps.org/refresher-exercise
Table 4: 2015 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>23</td>
</tr>
<tr>
<td>College/university</td>
<td>16</td>
</tr>
<tr>
<td>Industry</td>
<td>5</td>
</tr>
<tr>
<td>Government</td>
<td>3</td>
</tr>
<tr>
<td>Non-profit</td>
<td>1</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0</td>
</tr>
<tr>
<td>Other (biology teacher, hospital, self-employed)</td>
<td>2</td>
</tr>
</tbody>
</table>

The presentations will be available later this summer on the APS website\(^2\) and through the LifeSciTRC.

The 2016 Refresher Course, "Keep Your Eye on the Ion – A Refresher Course on Ionic Homeostasis and Systems Physiology," will focus on cellular homeostasis and is being organized by David Rodenbaugh (lead) and Karie Scrogin. All four invited speakers are internationally acclaimed for their work. The organizers are waiting to confirm their participation:

- John Osborn, Jr. (University of Minnesota) - Regulation of Sodium Homeostasis and Hypertension
- Biff Palmer (University of Texas, Southwestern) - Regulation of Potassium Homeostasis and Renal Disease
- Richard Klabunde (Marian University College of Osteopathic Medicine) - Cardiac ischemia and changes in ECG due ionic currents
- Lee Hamm (Tulane University) - Acid Base Disturbances and Regulation of Potassium

\(^2\) [http://www.the-aps.org/refresher-brain](http://www.the-aps.org/refresher-brain)
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 and Description</th>
<th>Number of Registrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>Writing and Reviewing for Scientific Journals – Blended: 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>22</td>
</tr>
<tr>
<td>Feb-Mar</td>
<td>Presentation Skills Online: Creating a Powerful Meeting Poster: 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>3</td>
</tr>
<tr>
<td></td>
<td>Presentation Skills Online: How to Present a Scientific Poster: This 7 day online course teaches the essentials of presenting a poster to multiple audiences at a scientific meeting. ($180; Member $90)</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Presentation Skills Online: How to Network at a Scientific Meeting: This 7 day online course provides the knowledge and skills needed to successfully network at a scientific meeting. ($180; Member $90)</td>
<td>7</td>
</tr>
<tr>
<td>May</td>
<td>Interviewing Skills Online: Interviewing for an Academic Position: 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>1</td>
</tr>
<tr>
<td>June-Aug</td>
<td>Writing and Reviewing for Scientific Journals Online: 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>11</td>
</tr>
<tr>
<td>July</td>
<td>Brazil Writing and Reviewing for Scientific Journals – Blended: 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. Held in partnership with the Brazilian Physiological Society.</td>
<td>23</td>
</tr>
<tr>
<td>Sept</td>
<td>Interviewing Skills Online: Interviewing for an Industry Position: 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>0</td>
</tr>
<tr>
<td>Oct</td>
<td>Presentation Skills Online: Writing a Powerful Meeting Abstract and Title: 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>1</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. 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. APS members Sue Barman, Heddwen Brooks, Robert Hester, Mark Knuepfer, Sadis Matalon, and David Pollock served as instructors. In July 2014, APS partnered with the Brazilian Physiological Society to offer a PST Course on Writing and Reviewing for Scientific Journals at the University of São Paulo, São Paulo, Brazil. APS members Sue Barman, Kim Barrett, Jane Reckelhoff, David Pollock, and Irv Zucker served as course instructors.

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. In 2014, 31 students participated in the online courses, and APS members Andrew Roberts, Merry Lindsey, Robert Carroll, Johana Vallejo, and Kathy Ryan 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: In February, nearly 20 RCR instructors reviewed the modules and provided feedback at a meeting in Dallas. This spring/summer, each RCR instructor is testing a module in RCR courses or seminars. PIs Matyas and Christina Bennett will finalize materials this fall for wide dissemination.
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 that related to the APS Refresher Course topic.

Update: Last year a new version of the Medical Physiology Course Directors website was launched that includes secure access for course directors only. This enhancement allows 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 private bulletin boards which will allow the group to have "members only" online discussion and resource sharing.

As reported to Council previously, a planning meeting was held in Bethesda in August 2014 to discuss needs of physiology professional education leaders, leading to a survey of course directors/managers and departments chairs. After discussions with Council and the Education Committee, creating a series of sessions at the 2016 APS Institute on Teaching and Learning (ITL) that would target needs of professional physiology educators seemed the best approach at this time. Wyss is currently working with the ITL Planning Committee on session topics, speakers, and possible workshops.

The Association of Professional Physiology Education Leaders (APPEL) was originally developed by the Education Committee in partnership with the Physiology Course Directors to provide excellent training in new methods for physiology education. Following the Committee’s initial activities and survey of APS members who were involved in professional school education, Council agreed with the Committee that the best model to for an APPEL meeting would be to juxtapose it with the Teaching Section’s Institute for Teaching and Learning (ITL). We have worked with the Section on planning this meeting for 2016 in Wisconsin. The model is to have half days devoted to breakout sessions for undergraduate vs. professional school education and then have the remaining time committee to plenary sessions that will be of interest to all participants. APPEL will also have a full day workshop led by USC Dean of Medicine Richard Hoppmann, an early adopter of ultrasound in medical education. We currently have 4 experienced APS/AAA members who have indicated that they are willing to serve as facilitators for this workshop at little cost to the workshop. Also, we are negotiating with GE to supply the ultrasound units to the workshop at no cost to APS. The Committee will continue to work with the Teaching Section to develop the full plan for the ITL and workshop. Barb Goodman is the point person for the organization of these events.

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 will be held on July 10-12, 2015 at the Vontz Center for Molecular Studies at the University of Cincinnati. The meeting has been planned in close cooperation between APS and ASPET. The Committee extends special thanks to Chip Montrose for his strong support in this effort. The APS Education Office worked with the Departments of Pharmacology and Cell Biophysics and of Molecular and Cellular Physiology, University of Cincinnati, to build the meeting website on the APS website and ASPET is handling registration. The program will focus on two major areas: enhancing the professional pipeline and fitting training to emerging needs. APS member speakers include Yana Zavros (Univ. of Cincinnati), Chip Montrose (Univ. of Cincinnati), Tom Pressley (Texas Tech Univ.), and John Lorenz (Univ. of Cincinnati). The APS Education Committee Chair and an APS Committee member will be attending the meeting.

Strategic Priority 4
Enhance opportunities for scientific interaction and exchange.

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 2014, former Education Committee members Robert Carroll and Tom Schmidt staffed an exhibit table at IAMSE, June 7-10, in Nashville, TN, and represented the APS. They shared information on APS membership, the Medical Physiology Learning Objectives, Medical Physiology Course Directors web, Professional Skills document, and the APS LifeSciTRC. Dr. Carroll also plans to represent APS at the June 2015 meeting.

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 2015 HAPS Conference was held May 23-25 in San Antonio, TX with 485 attendees from across the US, Canada, and other countries. APS President Patricia Molina, Louisiana State University Health Sciences Center, gave a presentation entitled, “Preclinical and Translational Studies Dissecting Chronic Alcohol Modulation of HIV Disease.” Dr. Molina’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. During the HAPS business meeting, APS was thanked for its continuous support of the HAPS annual conference. HAPS Executive Director Peter English also highlighted the LifeSciTRC collaboration between HAPS and APS.

http://www.the-aps.org/ndogs2015
APS also highlighted the LifeSciTRC at the meeting with a presentation to attendees and a hands-on workshop co-led by APS Education Office Staff and Julie Dais, LifeSciTRC Fellow and HAPS Member. The 2016 meeting will be held May 21-23 in Atlanta, GA and APS member Lacy Alexander will be giving the APS-sponsored update seminar.

III. National 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 2014 NABT Professional Development Conference was held Nov. 12 - 15th in Cleveland, OH. APS member Merry Lindsey (University of Mississippi) gave the presentation, “Cardiac Wound Healing after a Heart Attack.” The keynote address was very well attended with good interaction between Dr. Lindsey 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. The APS booth had a steady stream of traffic. The 2015 conference will be in Providence, RI in mid-November. Donald Jackson, Brown University, will serve as the APS keynote speaker.

IV. National 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: Two past Frontiers Teachers Julie Smith (2012) and Kyle Duhon (2012) acted as APS representatives for the Chicago conference, giving a workshop on APS Six Star Science and the Frontiers in Physiology Summer Research Fellowship. After their workshop they were interviewed by NPR for an article on summer professional development opportunities. The Education Office will continue this model of teacher presentations at annual meetings to take advantage of the great team of past Frontiers Teachers across the country.

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 conference was held November 8th-11th in Nashville, TN. The APS presence was a huge success in this fourth appearance at AMLE. There was tremendous interest in science, but few science workshops. The APS booth was once again very busy with teachers interested in science materials and information on the LifeSciTRC and new Frontiers programs. The 2015 conference will be October 14th-17th in Columbus, OH. 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. The biennial CUR Conference was held June 28-30, 2014 in Washington, DC. APS staff members Melinda Lowy and Brooke Bruthers organized a symposium on model undergraduate summer research programs that also featured Leadership Alliance and ASPET programs, as well as presenting a poster on APS programs. The next biennial CUR conference will be in 2016.

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 and joining the LifeSciTRC as a contributing partner. They are also interested in mirroring some of our K-12 initiatives in the UK.

B. Update: Wyss and Matyas will attend the PhySoc Education Meeting in Wales in July, 2015 to plan education sessions for the Dublin 2016 meeting.

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 originally developed the Life Science Teaching Resource Community (LifeSciTRC), previously named the Archive of Teaching Resources, as an open-access digital library of teaching resources. It serves as the main dissemination route for APS education and career materials as well as materials contributed by individual physiologists. APS contributes materials such as articles from Physiology, Advances in Physiology Education, and The Physiologist, APS press releases on journal articles, multimedia presentations from recorded EB symposia, video contest entries, and APS podcasts. The LifeSciTRC has partnerships with eight professional societies: Human Anatomy and Physiology Society (HAPS), Society for Developmental Biology (SDB), American Association of Anatomists (AAA), Massachusetts Society for Medical Research (MSMR), Northwest Association for Biomedical Research (NWABR), The Physiological Society (PhySoc), Genetics Society of America (GSA), and American Society for Plant Biologists (ASPB). These partners add their own peer-reviewed materials to the LifeSciTRC, making it a collaborative effort. The LifeSciTRC 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. In 2014 the LifeSciTRC expanded to an online community for life science educators at all grade levels. The LifeSciTRC now offers community pages, blogs, forums, resource ratings, resource comments, annotated resource collections, and a monthly newsletter specific to life science educators.

B. Update: In 2014, the LifeSciTRC added 414 new resources and 42 new collections. The LifeSciTRC currently contains more than 7,100 peer reviewed teaching resources and 250 collections. Resources and collections are submitted by partnering societies as well as individual educators and are peer-reviewed for scientific accuracy and the appropriate use of humans and/or animals in research.

In 2014, 1,638 individuals registered to use the LifeSciTRC bringing the total number of registered users to 8,243. However, registration is not required to view and download materials from the LifeSciTRC and in 2014 there were 801,981 visits to the LifeSciTRC.

C. Scholars and Fellows Programs: 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, 65 undergraduate educators and 24 high school educators have been LifeSciTRC Scholars. Of these, 18 undergraduate educators and 5 high school educators have gone on to be LifeSciTRC Fellows.

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.

A. Update: A PECOP community has been built in the LifeSciTRC to support the activities proposed in the incubator grant (www.LifeSciTRC.org/PECOP) and includes a blog and discussion forums. PECOP Fellows and Thought Leaders have been posting bi-monthly blogs on various topics since November 2014. Blog topics have included incorporating inquiry-based labs, using concept maps in an undergraduate exercise physiology course, and implementing oral exams for undergraduate physiology majors. Byse recruited new PECOP participants at the 2015 HAPS meeting and will offer a special LifeSciTRC Scholars program for PECOP Fellows and Thought Leaders to increase their digital library and community skills. PECOP Fellows and
Thought Leaders will also have opportunity to present workshops at education meetings in summer 2015.

Table 7: PECOP Project Summary

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, [www.apsarchive.org](http://www.apsarchive.org)), 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 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 member 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 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 an additional $250, or $750 in total.

B. Update: In 2015, 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, has also 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). Nine of the 30 David S. Bruce Outstanding Undergraduate Abstract Awardees and 5 of the 14 David S. Bruce Excellence in Undergraduate Research Awardees were recent participants from the 2014 undergraduate summer research fellowship programs. 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 2015, 87 applications were received and 30 Undergraduate Abstract Awardees were selected (see Appendix A). From these awardees, a subcommittee organized by Committee member Johana Vallejo-Elias 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, Tom and Beth Pressley and J. Michael Wyss. This support is gratefully acknowledged.
## Table 8: 2015 David S. Bruce Excellence in Undergraduate Research Awardees

<table>
<thead>
<tr>
<th>Student/Student Institution</th>
<th>Research Host/Host Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jenae Brown, Alma College</td>
<td>Esther E. Du Pont-Versteegden, Ph.D.</td>
</tr>
<tr>
<td>Andrielle Cowl, University of Minnesota</td>
<td>Thomas Olson, Ph.D.</td>
</tr>
<tr>
<td>Slavina B. Goleva, University of Kentucky</td>
<td>Jeffrey L. Osborn, Ph.D.</td>
</tr>
<tr>
<td>Shreya N. Kashyap, Tulane University</td>
<td>Sarah Lindsey, Ph.D.</td>
</tr>
<tr>
<td>Nabihah Khan, Benedictine University</td>
<td>Jayashree Sarathy, Ph.D.</td>
</tr>
<tr>
<td>Debby Lee, University of California, Merced</td>
<td>Catherine Uyehara, Ph.D.</td>
</tr>
<tr>
<td>Brittny A. McCormick, University of Arizona - Phoenix</td>
<td>Taben Mary Hale, Ph.D.</td>
</tr>
<tr>
<td>Kashif Osmani, University of Illinois at Chicago</td>
<td>Mrinalini Rao, Ph.D.</td>
</tr>
<tr>
<td>Andrew Tucker, Pennsylvania State University</td>
<td>Sean Stocker, Ph.D.</td>
</tr>
<tr>
<td>Robert Vanderkamp, Michigan State University</td>
<td>Brian Gulbransen, Ph.D.</td>
</tr>
<tr>
<td>Amrit Vasdev, Mayo Clinic</td>
<td>Carlos Mantilla, M.D., Ph.D.</td>
</tr>
<tr>
<td>Paige Wakefield, University of Alberta</td>
<td>Craig Steinback, Ph.D.</td>
</tr>
<tr>
<td>Travis Wakeham, Michigan Technological University</td>
<td>John Durocher, Ph.D.</td>
</tr>
</tbody>
</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 2015, approximately 200 APS members came to see 122 undergraduate physiology posters and to talk with the students. As shown in Figure 1, this was a large group of students and represents a 36% increase since 2011. In addition, students from the American
Association of Anatomists (AAA) presented their research. This year, 16 institutions and departments paid a $250 fee for table space to promote their graduate programs to the undergraduate students at the session, providing $4,000 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 printed out three sets of numbers from 1-150 (or whatever the maximum number of boards is) and staff and committee members distributed two or three numbers to each APS member as they arrived. Each member was asked to stop by the numbered posters. Members were very willing to participate. This seemed to increase the likelihood all students had visitors as several members reported back that they couldn’t get to their assigned students because of the great number of member attendees visiting the posters. The Committee will continue to follow this procedure next year because of its success.
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 2013-2014 and the 2014-2015 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 19 applicants, the Education Committee selected 13 teacher fellows to participate in this program (68% award rate); awardees are listed in (Table 9). These awardees completed their fellowship by participating in EB 2015 in Boston, MA.
### Table 9: Frontiers in Physiology 2014-2015 Research Teachers and Hosts

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Research 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 Baird</td>
<td>Alan 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 Klein</td>
</tr>
<tr>
<td>Miller Grove HS, Lithonia, GA</td>
<td>Emory University</td>
</tr>
<tr>
<td>Aaron McCalister</td>
<td>Dane Crossley</td>
</tr>
<tr>
<td>John Quincy Adams MS, Metairie, LA</td>
<td>Louisiana State University</td>
</tr>
<tr>
<td>June Miller</td>
<td>Jason Gardner</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>LSUHSC, New Orleans</td>
</tr>
<tr>
<td>Kathleen Stewart</td>
<td>Nicholas Gilpin</td>
</tr>
<tr>
<td>Garrett MS, Austell, GA</td>
<td>Philadelphia College of Osteopathic Medicine</td>
</tr>
<tr>
<td>Robert Stewart</td>
<td>Russ Price</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>Mitsi Blount</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 Monica Erwin (PA), Tonya Smith (SC), and Robert Manriquez (LA) for assisting the Committee in the review process.

For 2014-2015, the Education Committee selected eight 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 2016 in San Diego.


Table 10: Frontiers in Physiology 2015-2016 Research Teachers and Hosts

<table>
<thead>
<tr>
<th>Teacher</th>
<th>School, Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stacey Benson</td>
<td>Medical School of Wisconsin</td>
</tr>
<tr>
<td>Pewaukee HS, Pewaukee, WI</td>
<td></td>
</tr>
<tr>
<td>Judy Birschbach</td>
<td>Medical School of Wisconsin</td>
</tr>
<tr>
<td>West Bend East HS, West Bend, WI,</td>
<td></td>
</tr>
<tr>
<td>Catherine Dollard</td>
<td>University of Massachusetts</td>
</tr>
<tr>
<td>Northampton HS, Northampton, MA</td>
<td></td>
</tr>
<tr>
<td>Cecelia Dygdon</td>
<td>Loyola University</td>
</tr>
<tr>
<td>St Ann School, Lansing, IL</td>
<td></td>
</tr>
<tr>
<td>Melanie Loulouis</td>
<td>Julio Copello, Southern Illinois University</td>
</tr>
<tr>
<td>New Berlin HS, New Berlin, IL</td>
<td></td>
</tr>
<tr>
<td>Toshia Mannings</td>
<td>Meharry Medical School</td>
</tr>
<tr>
<td>Antioch HS, Antioch, TN</td>
<td></td>
</tr>
<tr>
<td>Caitlin Shecker</td>
<td>University of South Florida</td>
</tr>
<tr>
<td>Bishop McLaughlin HS, Spring Hill, FL</td>
<td></td>
</tr>
</tbody>
</table>

The Committee thanks former Frontiers Research Teachers Robert Manriquez, Tonya Smith, and Monica Erwin for assisting the Committee in the review process, the class mentoring and the Frontiers activities at EB 2015.

With support from the new NIH-SEPA award, a second class of Frontiers Teachers is currently working to complete a 10-month online course. Fellows selected for the initial online course are listed in the table below:

Table 11: Six Star Science Online Teacher Fellows

<table>
<thead>
<tr>
<th>Teacher</th>
<th>School, Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stephen Boliver</td>
<td>Belen High School, Belen, NM</td>
</tr>
<tr>
<td>Ashley DeNardis</td>
<td>Desert Ridge Middle School, Albuquerque, NM</td>
</tr>
<tr>
<td>Nealyn Dunlop</td>
<td>Roosevelt Middle School, New Bedford, MA</td>
</tr>
<tr>
<td>Tisha Grudzien</td>
<td>Gallistel Language Academy, Chicago, IL</td>
</tr>
<tr>
<td>Richardson Guerrier</td>
<td>Benjamin Franklin High, Philadelphia, PA</td>
</tr>
<tr>
<td>Tarla Hill</td>
<td>Belen High School, Belen, NM</td>
</tr>
<tr>
<td>Robert Martin</td>
<td>Sierra Middle School, Riverside, CA</td>
</tr>
<tr>
<td>Laura Milbeck</td>
<td>Kenmare High School, Kenmare, MD</td>
</tr>
<tr>
<td>Chelsey Servantes</td>
<td>Belen High School, Belen, NM</td>
</tr>
<tr>
<td>May Shlash</td>
<td>Clarksburg High School, Clarksburg, MD</td>
</tr>
<tr>
<td>Misty Torres</td>
<td>Belen High School, Belen, NM</td>
</tr>
<tr>
<td>Martha Ugalde</td>
<td>Belen High School, Belen, NM</td>
</tr>
</tbody>
</table>
VI. 2015 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 Life Science Teaching Resource Community and APS website along with related teaching materials.

**Update:** Education Committee member RK Rao coordinated the 2015 APS Workshop for High School Teachers and Students at EB. This year’s EB workshop coincided with Massachusetts state testing and had 75 area high school teachers and their students in attendance at the workshop on March 30, along with APS members and 2014-2015 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: “Deep dives and long breath holds: The diving physiology of emperor penguins and marine turtles” was given by Cassondra Williams, Ph.D. Her talk was followed by a Careers Panel that included Williams along with Kristine Deleon and Nick Aquirre this year’s Minority Outreach Fellows. The panel was moderated by 2014 Lead Mentor Instructor, Robert Manriquez. Twenty-one 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 Patricia Halpin, University of New Hampshire, 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 Barb Goodman, University of South Dakota and 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 2014, more than 14,000 students were reached at 86 event sites across the nation and Puerto Rico. This effort involved 65 APS member Lead Coordinators and a total of 599 scientists presenting and partnering with 304 classroom teachers and educators. The program exceeded its 2014 goal with outreach to 14,152 students. Distribution by grades included nearly 26% in high school classrooms, 53% in primary and elementary classrooms, and 21% in middle school classrooms. The number of physiologists (599), teachers (304), and event sites (86) all exceeded projected goals. The Committee is particularly excited about the large increase in the participation of physiologists in PhUn Week events.
Education and Marketing staff members are working on promotional materials to celebrate the 10th anniversary of PhUn Week.

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 2015, the session drew around 100 attendees, including physiologists and teachers. Patricia Halpin and Jessica Taylor directed the session in which members (including graduate/postdoctoral trainees) presented 27 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 66th ISEF, which provided an opportunity for the 2015 APS Award judges to meet some of the brightest young minds in the world. The Intel ISEF was held this year in Pittsburgh, PA on May 12-17, 2015. More than 1,700 students presented their own independent research and competed for over 5 million dollars in scholarships and cash prizes. For the 23rd 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 Dr. Lila LaGrange (University of the Incarnate Word), Dr. Carmen De Miguel (University of Alabama at Birmingham), Dr. Alan Sved (University of Pittsburgh), Dr. Bill Yates (University of Pittsburgh), and Dr. Anna Stanhewicz (Pennsylvania State University). The APS judging team evaluated 108 projects based on students’ abstracts and selected 18 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 Demetri Maxim from Gould Academy (Bethel, Maine) for his Cellular & Molecular Biology project titled “Directed Differentiation of Human Pluripotent Stem Cells into Functional Kidney Cells that Form Nephrons in Kidney Scaffolds.”
- **The second place APS award** ($1,000) was presented to Sanjana Rane from DuPont Manual High School (Louisville, Kentucky) for her Biochemistry project titled “The Role of Extracellular Nuclear Factor-Erythroid Derived Protein 2 (NF-E2) as a Danger Associated Molecular Pattern (DAMP) Released during Acrolein Induced Renal Fibrosis.”
- **The third place APS award** ($500) was presented to Sumanth Chennareddy from DuPont Manual High School (Louisville, Kentucky) for his Biomedical & Health Sciences project titled “Characterization of Vascular Responses to Mechanically Induced Continuous Flow Patterns in Bovine Models.”
- The APS Exceptional Science Award ($500) was presented to Jake Carrion and Michael Carrion from Jericho Senior High School (Jericho, New York) for their Computational Biology and Bioinformatics team project titled “Identification of Differentially Expressed Genes in Pancreatic Regulatory T Cell Survival.”

X. Clever Catch Balls

A. 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.

B. Brief update: We thank Council for approval of this project. The development and distribution of a new ball is being used in many primary/middle schools (4th-7th grades) in classrooms and especially during PhUn Week activities. The balls have been a great success as documented in the photo from LSUHSC.

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 as continuing to gather information and discuss this area and will present their approaches at the fall committee meeting. The Subcommittee examined the availability of undergraduate physiology programs in US institutions, and produced a list of “best practices as defined for the development and delivery of undergraduate degrees/programs /curriculum/courses in Physiology for the 21st century.” This list could be the basis of a position paper from APS, leading to a two-step process: (1) A broad self-evaluation for departments/programs to complete, making them aware of wider standards for the discipline of physiology; and (2) Peer evaluation from APS. The Committee found it hard to actually evaluate programs. The Committee focused on best practices. Smaller institutions might find this program an especially helpful way to show their physiology programs as being competitive on a national scale. The Committee agreed that it was important for APS to produce similar work, but that it was equally important for any proposal to use specific language that makes it clear that this is not a certification or accreditation program. The subcommittee will develop a position paper that outlines and describes a self-assessment checklist to present to the Committee in the fall.
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, Melinda Lowy, Kevin de Souza, Allison Hood and Miranda Byse. Their experience, talent and tireless work for the Society are greatly appreciated.

Respectfully submitted,
J. Michael Wyss, Chair
June24, 2015
### Appendix A: 2015 David S. Bruce Outstanding Undergraduate Abstract Awardees

<table>
<thead>
<tr>
<th>Student/Student Institution</th>
<th>Research Host/Host Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jenae Brown</td>
<td>Esther E. DuPont-Versteegden, Ph.D.</td>
</tr>
<tr>
<td>Alma College</td>
<td>University of Kentucky</td>
</tr>
<tr>
<td>Mark T. Cadena</td>
<td>Michelle E. Kimple, Ph.D.</td>
</tr>
<tr>
<td>University of Wisconsin – Madison</td>
<td>University of Wisconsin - Madison</td>
</tr>
<tr>
<td>Akhil Chandra</td>
<td>Nikki Gillum Posnack, Ph.D.</td>
</tr>
<tr>
<td>George Washington University</td>
<td>George Washington University</td>
</tr>
<tr>
<td>Daniel P. Chantigian</td>
<td>Michael J. Joyner, M.D.</td>
</tr>
<tr>
<td>Mayo Clinic</td>
<td>Mayo Clinic</td>
</tr>
<tr>
<td>Andrielle Cowl</td>
<td>Thomas Olson, Ph.D.</td>
</tr>
<tr>
<td>University of Minnesota</td>
<td>Mayo Clinic</td>
</tr>
<tr>
<td>Gabrielle Dillon</td>
<td>Kimberly Huey, Ph.D.</td>
</tr>
<tr>
<td>Drake University</td>
<td>Drake University</td>
</tr>
<tr>
<td>Charles T. Ganger</td>
<td>Darren P. Casey, Ph.D.</td>
</tr>
<tr>
<td>University of Iowa</td>
<td>University of Iowa</td>
</tr>
<tr>
<td>Taylor Glaesen</td>
<td>Lara R. DeRuisseau, Ph.D.</td>
</tr>
<tr>
<td>Le Moyne College</td>
<td>Le Moyne College</td>
</tr>
<tr>
<td>Slavina B. Goleva</td>
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