Education Committee Annual Report

Physiologist

Jeffrey Osborn
Education Committee Chair

ADInstruments Macknight Early Career Innovative Educator Award

The Education Committee received 6 applications for 2016. The quality of applicants was particularly outstanding in 2016 making choices difficult. The Committee unanimously recommended APS member Stefan Pulver of the University of St. Andrews, St. Andrews, United Kingdom as the 2016 awardee. His application focused upon the development of exercises that use the light activated chloride pump halorhodopsin to identify central pattern generating networks controlling locomotion in *Drosophila* larvae. The application was particularly outstanding because of its innovative use of Optogenetic tools and the ability to adapt and conduct these lab activities from secondary school through graduate physiology education.

EB 16 Refresher Course

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 2016 Refresher Course on “It's All in Your Head - A Refresher Course on the Brain and Systems Control” are now available on the APS website and through the LifeSciTRC.

The 2016 Refresher Course “Keep Your Eye on the Ion – A Refresher Course on Ionic Homeostasis and Systems Physiology” was very well-attended (~350 attendees). Overall course ratings were very high. There was a good mix of members from all APS membership categories among the attendees. The presentations will be available later by early Fall on the APS website and through the LifeSciTRC. Looking ahead to 2017, the Refresher Course will be titled, “Curricular Innovation in Sex and Gender Based Medical Physiology Education”. An outstanding group of internationally recognized speakers will present this Course at EB 17 in Chicago, IL.

Professional Skills Courses

A particular highlight was the APS Education Office and Publications Department, collaborating with the Society for Biological Engineers and Biomedical Engineering Society, received NSF funding to support development of professional skills training modules on publication ethics. 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.
**Medical Physiology and Graduate Program Course Directors**

Last year a new version of the Medical Physiology Course Directors website was launched that includes secure access for course directors. This enhancement allows them to share assessment resources such as case studies and test items securely. In addition, the LifeSciTRC has added private bulletin boards which will allow the group to have “members only” online discussion and resource sharing. For Graduate Program Directors, the next NDGS meeting will be held in 2017 with location to be determined. Stay tuned for upcoming announcements of this joint APS/ASPET graduate course director initiative.

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

The 2016 HAPS Conference was held May 21-23 in Atlanta, GA with attendees from across the US, Canada, and other countries. APS member Lacy Alexander, Pennsylvania State University gave a presentation entitled, “Human Skin as a Model Circulation for Examining Mechanisms of Microvascular Dysfunction.”

**Liaison with The Physiological Society (TPS), London**

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. Education Committee member Jessica Taylor and Director of Education Programs Marsha Matyas attended the PhySoc Education Meeting in Dublin, Ireland in July, 2016 to conduct a teaching symposium (Taylor) and plan educational sessions for future PhySoc meetings.

**Life Science Teaching Resource Community (Archive of Teaching Resources)**

The LifeSciTRC continues to grow as a national and international teaching resource. 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 2015, the LifeSciTRC added 281 new resources and 21 new collections. The LifeSciTRC currently contains more than 7,700 peer-reviewed teaching resources and 273 collections. As users, 1,187 individuals registered to use the LifeSciTRC in 2015 bringing the total number of registered users to 8,406. Registration is not required to view and download materials from the LifeSciTRC and in 2015 there were 800,335 visits to the LifeSciTRC.

**David S. Bruce Awards**

In 2016, 97 applications were received and reviewed by the Education Committee. Again, 30 of applications were selected as “David S. Bruce Outstanding Undergraduate Abstract Award”. These students were given the opportunity to present their posters to a panel of judges during the EB meeting. The panel of judges selected 15 to receive the “Bruce Excellence in Undergraduate Research Awardees” and $400, based on their presentation skills and interviews with the judges. This year’s top-ranked student was Lauren Newhouse, from the Mayo Clinic working with Mike Joyner’s lab. As the Bruce Award program has matured, the overall quality of the posters and presenters continues to improve. 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. The Bruce Awards remain an excellent mechanism for enhancing the pipeline to professional careers in physiology.
EB 16 Undergraduate Poster Session

The 2016 Undergraduate Poster Session was held on Sunday, April 3rd, in the San Diego Convention Center. Students were encouraged to attend the exhibitor tables to network with graduate programs. This year about 140 students attended and presented at the selective UG session. Of those students, 42 were APS UG fellows, and of those in that group, approximately 40 presented a first-author abstract programmed through their section. Of note, there were 17 exhibitors present at the Undergraduate Poster Session, most of which were graduate programs from around the country. This number continues to increase annually and we received excellent feedback from the students and exhibitors about the networking opportunity. There was significant foot traffic through the posters, and we received good feedback from attendees about how a select session focused entirely on undergraduates doing research is important to them.

Frontiers in Physiology Professional Development Program for Teachers

This extramurally funded education program, includes three components that are all currently running. Frontiers in Physiology: Integrating Programs to Build Communities of Practice (R25 OD016492), will develop, test, and disseminate a progressive three program model designed to promote excellence in science education and alignment with state and national Next Generation Science Standards (NGSS). The Six Star Science Online Teacher (OT) Professional Development Program will engage 30 middle/high school teachers annually in a year-long online professional development program that will increase their use of Six Star Science student-centered teaching methods that build students’ knowledge and skills in science and their understanding of the role of biomedical research in their lives and careers. The online program will reach teachers in both urban and rural areas and from all school types. Upon completion of the OT Program teachers can apply for the Frontiers in Physiology Research and Community Leader (RCL) Fellowship that will offer 15 teachers annually an opportunity to engage in a summer of hands-on biomedical research with APS members, work online to complete assignments and gain leadership skills that they will use at workshops and in online communities with colleagues, and experience research sharing by attending the Experimental Biology Meeting.

From a pool of 16 applicants, the Education Committee selected 8 teacher fellows to participate in the 2015 Frontiers Research Teacher Program (50% award rate); awardees are listed in (Table 9). These awardees completed their fellowship by participating in EB 2016 in San Diego, CA. The first class of Research Community Leaders was selected from a small pool of past Online Teachers. A requirement for this course is the completion of the online course so while the current pool is small the pool will be increasing each year. These awardees are working in the lab now and will complete their fellowship by participating in EB 2017 in Chicago, IL. Two regional APS chapters (Michigan and Puerto Rico) are in the process of developing regional communities to support K-12 science education. These communities will effectively engage MS and HS science teachers in chapter activities, integrate the Six Star Science principles into chapter K-12 outreach activities, provide content updates and best practice for student-centered learning, involve interactions between both teachers and researchers in the region, and provide information about the APS Frontiers program and Physiology Understanding Week.

EB 16 Workshop for Teachers and Students

Margaret Stieben of the APS Education Office coordinated the workshop for high school teachers and Education Committee member Patricia A. Halpin coordinated the 2016 APS Workshop for High School Students. This year’s EB workshop had 23 area high school teachers
and their 75 students in attendance at the workshop on Monday April 4, along with APS members and 2015-2016 Frontiers Research Teachers. The keynote address: "Human Performance in Extreme Environments" was given by Senior Associate Dean, Distinguished Professor of Endocrinology, at the University of Missouri, Warren Lockett Ph.D. His talk was followed by a Careers Panel that included Lockett along with Anne Whittaker, Ph.D., APS Minority K-12 Outreach Fellow and Nick Aguirre, BS, MS this year’s Minority Outreach Fellows. The panel was moderated by 2014 Lead Mentor Instructor, Robert Manriquez.

The afternoon student session was led by Patricia A. Halpin, University of New Hampshire, along with 2014 Lead Mentor Instructor Robert Manriquez and several APS members. 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.

**Physiology Understanding (PhUn) Week**

In November 2015, the APS celebrated the 10-year anniversary of PhUn Week program. In 2015, 16,188 students were reached at 101 event sites across the nation and Puerto Rico. This effort involved 115 APS member Lead Coordinators and a total of 680 scientists presenting and partnering with 281 classroom teachers and educators. The program continues to exceed its annual goal, which was increased to 16,000 from 14,000 students the year before. Distribution by grades included nearly 31% in high school classrooms, 45% in primary and elementary classrooms, and 24% in middle school classrooms. The number of physiologists (680), teachers (281), and event sites (101) all exceeded projected goals. The Committee is particularly excited about the large increase in the participation of physiologists in PhUn Week events.

In 2016, the PhUn Week Training Session at Experimental Biology session drew over 100 attendees, including physiologists and teachers. Jeff Osborn and Jenny Sasser directed the session in which members (including graduate/postdoctoral trainees) presented 34 posters at the training session. Participants were also encouraged to submit these posters to the LifeSciTri online resource library. ADInstruments continued its tradition of sponsoring a continental breakfast. The incredible success of this society wide program was celebrated with a poster session and award ceremony for 5 year and 10 participants. Special recognition goes out to Diane Munzenmeier (Center for BioMolecular Modeling, Milwaukee School of Engineering) who not only spearheaded the launching of PhUn week as a member of the education committee but has also conducted PhUn week workshops in each year of the program’s existence.

**USA Science and Engineering Festival**

More than 350,000 children, parents and teachers attended the 2016 USA Science & Engineering Festival (USASEF) at the Convention Center in Washington, DC April 15-17. For the first time, the festival included a “Sneak Peek Friday” that allowed school groups to attend the festival. More than 60,000 students and teachers attended this event. On Saturday and Sunday, parents and children of all ages filled the exhibit halls, exploring areas of science, engineering, and technology. APS shared the Medicine and Health area with other professional societies, NIH, NSF, and other federal agencies and companies. APS activities were organized by the Education Committee and Education Office. A demographic and ethnic diversity of
visitors to the APS booth included young and old adult individuals, parent-child or family groups, and groups of young children and adolescents. There was a steady and constant flow of guests engaging in both APS booth activities on the “Healthy Heart Race” and a demonstration on insulation using fat, feathers, and skin in cold water. At the APS booth, seven members worked each day to engage thousands of attendees in hands-on physiology activities. Education Committee members included the committee chair, Jeff Osborn, University of Kentucky as well as committee members Patricia Halpin, University of New Hampshire, and Jessica Taylor, College of Osteopathic Medicine William Carey University. APS Minority Outreach Fellows (past and present) included TanYa Gwathmey, Wake Forest University, Elinette Albino-Rodriguez, Ponce Health Sciences University, and Jessica Ibarra, University of the Incarnate Word. Porter Committee member, Stan Andrisse, Johns Hopkins University also served on the team. Members distributed thousands of APS Career Trading Cards and Phizzy Bear Activity Books to teens and children to promote physiology career exploration.

**Recognition Project**

The Education Committee is continuing its exploration and possible expansion of recognizing undergraduate programs in physiology that serve as exemplars in preparing students for physiology careers. A subcommittee is gathering information and will present their approaches at the fall 2016 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.” The group is led by Drs. Erica Wehrwein of Michigan State University and Carissa Krane of the University of Dayton. The relationships between undergraduate departments and Colleges of Arts and Sciences and Medicine must be carefully explored and vetted. The Committee is committed to focusing 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 feels it is important for APS to produce similar work, but equally important for any proposal to use specific language that makes it clear that this is not a certification or accreditation program. This next arena for the discipline of physiology is critical to our defining and branding of the society as a whole. The Chair and committee are deeply committed and invested in making undergraduate physiology a major focus for APS in the coming years.

Council accepted the report of the Education Committee