This report provides summaries of Physiologists in Industry (PIC) activities during 2016-2017.

A. EB2018 PIC Symposium

Background: PIC sponsors an EB symposium each year focusing on translational research. The 2018 symposium was entitled “Biosensors Advancing Health and Disease Research”. This symposium explored three new applications for biosensor technology in life science research and how they have been used to produce better results. The session was organized and chaired by Brandon Bucher (ADInstruments) and co-chaired by T Dylan Olver, Ph.D (University of Missouri). Mr. Boucher was the NCAR section rep who has since rotated off the committee and Dr. Olver was our 2017 Novel Disease Model Award recipient at the postdoctoral level. Topics for the symposium included “Emerging Technologies, The use of telemetry to study glucose metabolism” by Patrick Tso, University of Cincinnati Medical Center. “Wearable technology for injury prevention and optimal performance” by Mark Buller, U.S. Army Research Institute of Environmental Medicine. “Closed-loop neuromodulation in physiological and translational research” by Stavros Zanos, Feinstein Institute for Medical Research. The session abstract is provided below.

ABSTRACT: Innovation in biosensor technology plays a vital role in removing the barriers to advancement in health and disease research. Novel ideas and concepts must often wait for step changes in technology to make answering important questions possible. These technologies can allow scientists access to new sources of data, improving the quality and clarity of data, better support a new experimental protocol, or increase subject welfare. This symposium explores three new applications for technology in life science research, exploring how they have been used to produce better results in health research. Continuous glucose monitoring implants have been able to provide researchers access to new data, improved animal welfare, at a lower running cost within the lab. This improved dataset enables a more accurate and comprehensive understanding of glucose homeostasis, glycemic variability, and acute responses to experimental stimuli, improving the ability to answer existing scientific questions and to ask new questions for which answers would not be possible using traditional blood sampling techniques. Continuous glucose telemetry devices have been improving outcomes in research applications such as diabetes, nutrition, obesity, and metabolism research. Wearable technology has extended the range of where Soldiers, athletes, and patients can be monitored to a more natural environment allowing new insights into performance, stress, injury, and physiological regulation. While new sensors, algorithms, and tools promote a more reliable and repeatable approach to gathering data around thermal work strain, injury, and exertion in the field, work is underway to better understand how these streams of information can be used as actionable physiological information. Machine learning algorithms and readily available computational power can be harnessed and directed by the physiologist to provide methods of managing physiological risks during training in the military, to allow athletes to optimize training and performance, and to provide greater insights than before. In a typical neuromodulation experiment, the nervous system is subjected to a set of controlled conditions and neurostimulation manipulations, while physiologic measurements are taken, and analyzed off-line. However, in some cases, the timing of neurostimulation needs to be tightly controlled and associated with certain neural or physiological parameters, especially when those parameters are dynamic and changing rapidly. In such cases, neurostimulation has to be delivered in real-time, upon the occurrence
of certain physiological states inferred by a set of measurements that are taken simultaneously, in a "closed-loop" manner. The principles, components and algorithms behind experimental and clinical closed-loop systems will be discussed, and two examples will be presented in more detail: neural activity-dependent brain stimulation for the induction of cortical plasticity and pulmonary artery pressure (PAP)-dependent stimulation of the cervical vagus for pulmonary vasodilation in a model of pulmonary hypertension. This state-specific, closed-loop modulation of central or peripheral neural activity via real-time neurostimulation may be a strategy for treating disorders in an "on-demand" manner.

Update/Outcome: The symposium was held on Monday, April 23 1:30–3:00 PM in the San Diego Convention Center, Room 26AB. All scheduled speakers were able to present. Feedback from PIC attendees as well as others indicates that the basic research topics were well received and well attended at the start of the symposium. Unfortunately, attendance declined substantially during the wearable technologies section. The Committee discussed the outcome. One reason was that this symposium was scheduled at the same time as the Carl Ludwig Lecture.

B. EB2018 Translational Research Awards
Background: The Physiologists in Industry Committee “Translational Research Award” is given to one postdoctoral fellow and one doctoral student each year. This award recognizes a trainee whose performed research that is translatable to industry applications and has been designated by the Physiologists in Industry Committee as an outstanding example of experimental research. Applicants are evaluated on their first-author EB meeting abstract and a supplementary one-page (maximum) description of 1) the translational nature of their project and its potential utility for future research, 2) their contribution to the work, and 3) their career goals.

Update/Outcome: This award was previously named the Novel Disease Award but was changed to translational research award for 2018. The PIC felt that the term “novel disease” limited the number of applicants who apply for the award and has limited interest in providing funding for the award. In an effort to increase the number of applications and reach a wider group of potential applicants as well as to broaden the potential funder base, APS council approved changing the name of the PIC Award from “Novel Disease Model” to “Translational Research Award. This broadened the award focus to include more areas of research that is translatable to industry applications (e.g., treatment development or improvement, diagnosis, mechanism of action, health & wellness, etc.). Changing the name and scope of the award resulted in a more than doubling of the applicant pool. In prior years, the typical number of applicants was 18-20; this year we received 39 applications.

The winner of the 2018 postdoctoral award is Dr. Paramita Pati, University of Alabama at Birmingham, for the project entitled “Evidence for circadian control of endothelial function in mice on a high fat diet”. The winner of the predoctoral award is Jianxiang Xue, University of South Florida, for the project entitled “Inducible intestinal epithelial cell-specific NHE3 knockout causes diarrhea and more alkaline luminal content”. Both awards will be presented at the APS Business Meeting Tuesday, April 24, at 5:30 PM in room 20A of the San Diego Convention Center.

D. EB2018 PIC Business Meeting
Background: PIC schedules a business meeting held at EB each year.
Update/Outcome: This year’s meeting was held on Sunday, April 22, 2:30 - 4:00 pm in the San Diego Marriott Marquis & Marina, Carlsbad Room. Matthew Zahner (PIC Chair) chaired the meeting. At the meeting, the following items were discussed.

- Committee would like to request scheduling for the 2019 symposium on Sunday 10:30 am to 12:30 pm at the June 2019 JPC meeting and a room to accommodate ~200 attendees.
- The committee discussed possible topics and general parameters of future symposia. For example, they decided it was better to focus on issues of broader interest such as emerging technology and its contribution to research.
- 2019 symposia topic: “SGLT2 inhibitors: from basic physiology to clinical success”.
- Committee discussed ways to and identify active roles improve the participation of co-chair postdoctoral PIC awardee.
- The committee discussed the award presentation to be made at the APS Business Meeting on Tuesday. (Dr. Zahner will present the awards).
- Committee agrees to continue to invite the postdoctoral award winner to co-chair the 2019 PIC symposium as well as to invite both predoctoral and postdoctoral recipients to attend PIC Mixer.
- Committee discussed the role of each section representative as ambassador to his or her section and the possibility of creating a trainee position for each section within the committee.
- Committee also wants to continue to enhance communication with trainees regarding industry internships opportunities via web-links on the PIC and APS websites and through APS listservs and social media. Dr. Matyas reported that the list of summer internships that were provided by PIC members in previous years is on the APS website (see http://www.theaps.org/mm/Education/GraduateProfessional/Postdoctoral-AwardsFellowships/Industry-Internships-and-Fellowships). Dr. Matyas will ask the new Higher Ed Program Coordinator to redo the survey of industry members and update the list of internships and fellowships in 2018-2019.
- Committee welcomed the following PIC representatives:
  - Craig Plato (CV)
  - Marko Poglitsch (NCAR)
- A PIC teleconference is being scheduled for Sept 2018 to discuss the PIC symposium, the PIC Award, and other items from the business meeting.

C. EB2018 PIC Mixer
Background: The Annual Physiologists in Industry Committee Mixer is traditionally a great opportunity to network with industry and academic APS members alike. The mixer is designed to attract trainees and engage them in discussion about careers, research, and opportunities in industry positions.

Update/Outcome: The 17th annual PIC mixer was held on Sunday, April 22nd, 6:45 PM Marriott Oceanside Room. The mixer attracted individuals across all levels of training. This year we included a cash bar and free hors d’oeuvres. The mixer was very well attended with over 50 attendees at any time. The room was filled from 6:45 until the event closed. The mixer provided a great chance for meaningful discussions on industry career opportunity, and trainees received good feedback from attendees.

E. EB2019 PIC Symposium
In order to foster greater interaction among sections, academia, and industry, the 2018 PIC symposium will focus on basic sciences topics with preclinical stages of development and translation that has broad appeal to cross sectional APS members. The title of 2018 PIC symposium is “SGLT2 inhibitors: from
basic physiology to clinical success”. The session will be coordinated and chaired by Romer Gonzalez Ph.D. and co-chaired by Pati Paramita, Ph.D. Dr. Gonzalez is an active member of the PIC (Renal rep) and Dr. Paramita is our 2018 Translational Research Award recipient at the postdoctoral level. The session abstract is provided below.

ABSTRACT: Basic physiology experiments indicate that the sodium-glucose cotransporter 2 (SGLT2) is responsible for most glucose reabsorption in the kidneys, a key mechanism for glucose homeostasis. Based on this knowledge, SGLT2 inhibitors (SGLT2i) were developed to lower plasma glucose in diabetic patients. However, in addition to its glucose lowering effects, several large clinical trials showed that SGLT2i confer strong cardiovascular and possibly renal protection. These findings resulted in a multiplicity of ongoing efforts looking to expand the use of SGLT2i to other indications including heart failure and diabetic kidney disease. These observations make the SGLT2i an excellent example of the broad impact that the study of physiology continues to have in human medicine.

JPC Representative: Matthew Zahner Ph.D. will serve as PIC representative to the JPC and will attend the June 2018 meeting.

F. Summary and Conclusions
PIC continues to support the efforts of APS with the initiatives discussed above. We have a committee that is active in PIC/APS, many with new, fresh ideas that will help further strengthen the PIC/APS relationship, and help maturing physiologists understand how industry can contribute to better physiology-based science.

I would like to thank Council for their generous support, especially for the oversight of Marsha Lakes Matyas and her staff in the APS Education Office. It was a great pleasure for me to serve as the Cardiovascular Section representative for the past 3 years and it is a honor for me to be selected to now serve as the PIC Chair. I look forward to continuing to serve and support APS visions, goals and missions in future.

Respectfully submitted,

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