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What Does Science Tell us About Resilience: Lessons for Early Career Scientists

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Karen Quigley

For last year's Experimental Biology meeting, I was asked to talk to junior scientists about "what science tells us about being resilient in our careers." Like any professional, academic scientists face ups and downs over a career, and, for junior scientists, it can be hard to take the long view because you don't yet *have* a long view. I like to think of it this way: Your career is a series of marathons. Thinking about it in this way will help you make it across the multiple "finish lines" that will occur in your career. The "science of resilience" provides some suggestions about what to pay attention to in your career and your life, in addition, of course, to doing really great science. Resilience has been defined by the American Psychological Association (*http://www.apa.org/helpcenter/road-resilience.aspx*) as "the process of adapting well in the face of adversity, trauma, tragedy, threats and even significant sources of stress." There are a wide variety of major and minor events that may require one to adapt. The scientific literature on resilience reveals that some aspects of our lives that impact resilience are things we have little choice or control over, such as having a childhood with multiple major stressors, being born into poverty, or having a serious or life-threatening illness. These can be overcome; in other words, neither biology nor experience alone equals destiny. In fact, many who are exposed to such events adapt very well. Here, I will provide a brief and selective overview of the science behind the good behavioral habits that all of us can use to enhance our resilience and reduce distress in the face of professional adversity.

When it comes to determining the features of our lives that we can control and that will help us adapt most quickly and adroitly when life's challenges come our way, what our parents always told us turns out to be true. I will focus on four basic health habits that can help us to weather the "slings and arrows" of an academic career – from

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Annual Surveys

Association of Chairs of Departments of Physiology 2015 Survey Results

Elsa I. Mangiarua (Secretary-Treasurer; Marshall University), Melinda E. Lowy (Executive Assistant, ACDP), and T. Richard Nichols (President, Georgia Institute of Technology)

The Association of Chairs of Departments of Physiology annual survey was sent electronically to 208 physiology or physiology-related departments throughout the U.S., Canada, Mexico, and Puerto Rico. A total of 55 partial or complete surveys were returned, for a response rate of 26%. This rate is higher than in previous years. Of the 55 surveys received, there were 14 private and 41 public medical schools.

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Business Meeting Minutes

American Physiological Society 169th Business Meeting

Time: 5:45 PM, Tuesday, April 5, 2016
Place: San Diego, CA

I. Call to Order

The meeting was called to order at 5:45 PM by President Patricia E. Molina, who welcomed members to the 169th Business Meeting of the American Physiological Society.

II. Election of Officers

President Molina announced the results of the election. The new President-Elect is Dennis Brown (Massachusetts General Hospital, Harvard Medical School; April 06, 2016 to April 10, 2019). The three newly elected councillors are Jennifer Pollock (University of Alabama at Birmingham), Harold Schultz (University of Nebraska Medical Center), and Willis "Rick" Samson (Saint Louis University School of Medicine) (April 06, 2016 to April 10, 2019). The newly elected councillors will serve a 3-year term. All newly elected officers will assume office at the close of EB2016.

III. Membership

A. Summary of the Membership Status

President-Elect Jane Reckelhoff reported on the status of the Society membership. As of March 1, 2016, the current membership of the Society is 10,830, of which 7,616 are regular members, 22 are honorary members, 1,101 are emeritus members, 112 are affiliate members, 1,641 are graduate student members, and 338 are undergraduate student members. She also indicated that women make up 29% of the membership, 27% of our members reside outside of the U.S., and 40% are under the age of 45.

B. Deaths Reported Since the Last Meeting

A list of the names of those members whose deaths had been reported since the 2015 Business Meeting was displayed. Reckelhoff asked the membership to stand and to observe a moment of silence in tribute to their deceased colleagues.

IV. State of the Society

President Molina addressed the membership and spoke on the state of the Society.

A. Expenses and Revenue

Molina said that the Society is financially sound, with the current revenue at $19.7 million and expenses totaling $19.6 million. The majority of the revenue is generated by the Publications Department, while Meetings/Membership, Education, and the reserves account for the majority of the remaining revenue. Molina stated APS is fortunate to have a strong publications program that contributes 76% of our revenue. The Society also generates revenue from your membership dues and our meetings, as well as grants that are generally associated with our education program. In addition, the APS utilizes 4% of its reserves to help support the Society's programs.

B. APS Initiatives

1. Publications.

Molina said that APS and The Physiology Society (TPS) are publishing an open access journal entitled *Physiological Reports,* which launched in March 2013. Since the launch, 863 articles have been published, with an average time to first decision of 8 days and an 89% acceptance rate.

Molina said that all of the journals are doing well. For the 14 published journals, 6,296 manuscripts were received, and 3,978 were published. The time to first decision is 21.2 days. The Society is pleased to welcome two new editors for our journals, Bina Joe for *Physiological Genomics,* and Andre Marette for *AJP-Endocrinology and Metabolism.*

Molina reported on *APSselect*, which is a timely collection that highlights the highest-quality research papers accepted each month by the 10 APS research journals. These articles are recommended by the Editors, and the final selection is made by the Selection Committee. They can be viewed at *http://apsselect.physiology.org*. *APSselect* articles experience a spike in usage on publication vs. non-*APSselect* articles.

2. Meeting Program.

Molina reported that APS would be holding three conferences in 2016: The Institute on Teaching and

Learning Workshop will be held June 20-24 in Madison, Wisconsin; Inflammation, Immunity, and Cardiovascular Disease is scheduled for August 24-27 in Westminster, CO; and The Integrative Biology of Exercise VII is scheduled for November 2-4 in Phoenix, AZ. She also reminded attendees that next year's Experimental Biology meeting will be held in Chicago, IL, April 22-26, 2017. Molina stated it is our true desire to see a growth in the number and quality of these APS conferences in the future.

3. Education Programs.
Molina said that the APS Education programs help to promote excellence in science teaching, learning, and the training of future physiologists. The Education Department is responsible for managing many of the awards that are provided by the APS and provides resources for K-12 education, undergraduates, graduates/professionals, continuing education, and minority scientists.

Molina reported that the Education Department has developed a Professional Skills Training (PST) course on "Becoming an Effective Teacher." The Education Department has also launched Physiology Educators Community of Practice Fellowship (PECOP) for all physiology educators. The Department is also working with a task force to develop a Leadership Academy to prepare the next generation of Society leaders and to help our members succeed in their own careers. The APS Archive of Teaching Resources has new partners and new community tools. Professional Skills Training courses are now available online, with some eligible for graduate credit.

Molina encouraged all members to plan now for PhUn Week 2016, which will be held November 7-11, 2016 (*www.PhUnWeek.org*).

4. Science Policy.
Molina said the Science Policy Office works with several APS Committees, FASEB, and other organizations to monitor issues related to federal research funding and animal research. You can follow them via Twitter *@SciPolAPS* or on the AP website.

5. International Outreach.
Molina stated that 27% of the APS membership lives outside of the U.S. It is one of the reasons why APS is outward facing and participated in a number of international meetings. The APS will be participating in a joint meeting in Dublin with The Physiological Society, July 29-31, 2016. The APS is also participating in the International Conference of Physiological Sciences in Beijing, September 25-28, 2016. In 2017, the IUPS Congress will be in Rio de Janeiro, Brazil, and, in 2019, the 2nd Pan-American Congress will be in Havana, Cuba. Molina noted that, on Monday April 4th, APS met with colleagues from the African Association of Physiological Sciences and discussed how we can partner to further their research and teaching skills.

C. Final Comments

Molina expressed that, over the past few years, APS has been concerned about how physiology is perceived by the community of scientist, our academic and government leaders, as well as students. As a result, APS Council approved the hiring of a consulting group, Minding Your Business, to help us create a strategic communication plan that will help to improve the image of physiology and the Society. Their approach has included surveys and focus groups directed at learning the perceptions of APS and physiology as a discipline. Friday, April 1, the APS Council participated in an afternoon of self-reflection and analysis of how we view ourselves within the lay and scientific communities and what we believe our challenges are. We hope to receive consulting group's report over the summer and use it as the basis for our next strategic planning meeting.

Molina reminder the attendees to attend the Nobel Prize lecture, held at 4:45 PM on Wednesday, April 6. The Lecture will be presented by Roger Tsien and followed by a reception to allow graduate students and postdoctoral fellows to meet him, get his autograph, and have their picture taken with him. She pointed out that the final event for this year's APS annual meeting will be the closing party, which will feature a semi-battle of the bands. GI Distress will be joined on stage by Cornu Ammonis.

V. Awards and Presentations

A. Ray G. Daggs Award

Ray G. Daggs was the APS Executive Secretary-Treasurer between 1956 and 1972. In tribute to his devotion to the Society, the Ray G. Daggs Award was established and is given annually to a physiologist for distinguished service to the Society and to the discipline of physiology. The

APS President Patricia Molina presents the Ray G. Daggs Award to John E. Hall

2016 Daggs Awardee is John E. Hall, Guyton Professor and Chairman of Physiology and Biophysics and Director of the Mississippi Center on Obesity Research at the University of Mississippi Medical Center.

Hall received his doctorate in physiology with James Schwinghamer at Michigan State University in 1974 and did postdoctoral training at the University of Mississippi Medical Center with Arthur Guyton before joining the faculty in 1976. He was promoted to full professor in 1982 and appointed as department Chair in 1989. Hall's major research interests include cardiovascular and renal physiology, mechanisms of hypertension, the renin-angiotensin system, obesity and insulin resistance, and modeling and computer simulation of the cardiovascular-renal systems. His early work demonstrated the importance of the direct intrarenal actions of angiotensin II (ANG II) in regulating renal tubular sodium reabsorption, renal-pressure natriuresis, and long-term blood pressure. His laboratory was the first to demonstrate that renal-pressure natriuresis plays a crucial role in maintaining sodium balance in several experimental models of hypertension and that increased arterial pressure occurs as an essential compensation for impaired kidney function and an inability to maintain sodium balance at normal arterial pressure. In recent years, his research has helped to unravel the renal and neurohumoral mechanisms that link obesity with hypertension and kidney disease. His research has been continuously funded by the National Heart, Lung, and Blood Institute (NHLBI) since 1975, and he has been the principal investigator of a Program Project Grant from NHLBI since 1988. Hall has authored or co-authored over 390 publications and has written or edited 11 books, including the *Textbook of Medical Physiology*. He has been Chief Editor of *American Journal of Physiology – Regulatory, Integrative and Comparative Physiology and Hypertension*, and serves on the editorial boards of several international journals.

Hall is the past Chairman of the Council for High Blood Pressure Research, American Heart Association; Chair of the Committee of Scientific Councils, AHA; and President-Elect of the Inter-American Society of Hypertension. He also serves on the executive committee of The American Society of Hypertension and the Board of Directors of the AHA. Hall has been an active member of APS since 1976. He is a member of the Water and Electrolyte Homeostasis Section, the Renal Section, and a Fellow of the Cardiovascular Section. He served as Chair, Treasurer, and Councillor of the Water and Electrolyte Homeostasis Section, as a member of APS Council in 1991, as Chair of SAC from 1997 to 2000, on the APS Strategic Planning Committees in 1992 and 2000, on the Long-Range Planning Committee, on the Task Force for Translational Research, on the Blue Ribbon Panel on APS Programming, and on several other committees of APS. He was the 74th APS President in 2001-2002. Hall's awards include the Richard Bright Award of the American Society of Hypertension, the Harry Goldblatt Award of the American Heart Association, the Merck, Sharp, and Dohme International Research Award from the International Society of Hypertension, the Lewis Dahl Award of the American Heart Association, the Marion Young Scholar Award of the American Society of Hypertension, the Ernest Starling Lectureship of the APS, an NIH Career Development Award, and the Novartis Award in Hypertension Research.

In accepting the award, Hall thanked the Society and mentioned that it was a tremendous privilege to participate in the APS activities. He told the younger members that they would not find a Society that is more welcoming and encourages its younger scientists to get involved in Society affairs. He encouraged everyone to get involved in the APS. He thanked the University of Mississippi Medical Center for supporting him for so many years. Lastly, he thanked the Awards Committee of the APS.

B. S&R Foundation Ryuji Ueno Award

The S&R Foundation Ryuji Ueno Award was established in 2007 by the American Physiology Society through the generous support of Ryuji Ueno and Sachiko Kuno and the S&R Foundation. Ryuji Ueno and Sachiko Kuno are founders of Sucampo Pharmaceuticals and the S&R Foundation, both in Bethesda, MD. This award recognizes an APS member who has demonstrated outstanding research promise. The award is given annually to an early career physiologist demonstrating outstanding promise in research in wound healing, tissue remodeling, and/or organ regeneration. The award of $30,000 is designated for the awardee's research program. APS is pleased to recognize this year's awardee, Li Zuo (Ohio State University). John Cuppoletti joined with President Molina to present the award to Zuo.

C. Beverly Petterson Bishop Award for Excellence in Neuroscience

The Beverly Petterson Bishop Award recognizes excellence in neuroscience/neurophysiology research. The award is given to an investigator who holds an academic rank no higher than assistant professor. The award is presented annually to an individual demonstrating outstanding promise based on his/her program in neuroscience/neurophysiology research. Each recipient receives a $20,000 award designated for use in their research program. APS is pleased to recognize Brian Gulbransen (Michigan State University).

D. Giles F. Filley Memorial Awards

As a result of a bequest from the family of Giles F. Filley, a memorial fund was established to recognize excellence in research in respiratory physiology and

APS President Patricia Molina presents the S&R Foundation Ryuji Ueno Award to Li Zuo of Ohio State University

APS President Patricia Molina presents Jing Liu with the Giles F. Filley Memorial Award

APS President Patricia Molina presents the Beverly Petterson Bishop Awards for Excellence in Neuroscience to Brian Gulbransen

APS President Patricia Molina presents Leonardo Ferreira with the Giles F. Filley Memorial Award

APS President Patricia Molina presents the Arthur C. Guyton Young Investigator Award to Alain Frigon of the Universite de Sherbrooke

APS President Patricia Molina presents the Lazaro J. Mandel Young Investigator Award to Jennifer Pluznick

medicine. Two annual awards of $14,500 are made to junior faculty members (at an academic rank no higher than assistant professor). APS is pleased to recognize this year's awardees, Leonardo Ferreira (University of Florida) and Jing Liu (Northwestern University).

E. Arthur C. Guyton Award for Excellence in Integrative Physiology and Medicine

The Arthur C. Guyton Award Fund was established in 1993 to recognize the contributions of Arthur C. Guyton and his interests in feedback, modeling, and integrative physiology. The awards are made to an independent, junior investigator pursuing research that uses integrative approaches to the study of physiological function and explores the role of feedback regulation in physiological function. The award is for $25,000 and is designated for use in the awardee's research program. This year's awardee is Alain Frigon (University of Sherbrooke).

F. Lazaro J. Mandel Young Investigator Award

As a result of a bequest from the wife of Lazaro J. Mandel, a memorial fund was established to recognize excellence in epithelial or renal physiology. An award is made to a junior faculty member who has demonstrated outstanding research promise. The award is $6,500 and is designated for use in the awardee's research program. This year's awardee is Jennifer Pluznick (John Hopkins University School of Medicine).

G. Shih-Chun Wang Young Investigator Award

As a result of a bequest from the wife of Shih-Chun Wang, a memorial fund was established to recognize excellence in physiology. An annual award is made to a junior faculty member who has demonstrated outstanding research promise. The award of $7,500 is designated for the use in the awardee's research program. APS is pleased to recognize this year's awardee, Il-man Kim (Augusta University).

APS President Patricia Molina presents the Shih-Chun Wang Young Investigator Award to Il-man Kim of Augusta University

H. Dean Franklin Young Investigator

The Dean Franklin Young Investigator Award was established by Data Sciences International (DSI) to recognize Franklin's role in developing instrumentation to monitor physiological function in conscious animals and humans. The award recognizes a postdoctoral scientist or junior faculty member who is pursuing in vivo physiological research and is in the process of establishing an independent laboratory. The award recipient receives a travel award of $1,500 to attend the annual Experimental Biology meeting to present his/her work, and a DSI instrumentation starter kit valued at approximately $20,000. Bradley Main of DSI joined

APS President Patricia Molina and Bradley Main of DSI present the Dean Franklin Young Award to Timo Rieg

APS President Patricia Molina presents Keisa W. Mathis the Dale J. Benos Early Career Professional Service Award

Molina to recognize this year's awardee, Timo Rieg (University of California, San Diego, and VA San Diego Healthcare System).

I. ADI Macknight Progressive Educator Award

The ADInstruments Macknight Progressive Educator Award is named in honor of Anthony Macknight, an APS member since 1978 and founder of ADInstruments. The award honors an APS member who incorporates innovative teaching techniques and technology resources to engage undergraduates in physiology education. The awardee receives a $1,500 travel award to attend the EB meeting and an institutional grant providing the award recipient's institution with a PowerLab LabTutor Physiology Teaching Bundle or equivalent. This year, the Society is pleased to recognize Stefan Pulver (University of St. Andrews) as the ADInstruments Macknight Progressive Educator Awardee.

J. Dale Benos Early Career Professional Service Award

The Early Career Professional Service Award honors an APS member who is judged to have made outstanding contributions to the physiology community and furthered its broader goals. This award was established to recognize the late Dale Benos, the Society's 79th President, Chair of Physiology at the University of Alabama, Birmingham, and a distinguished physiologist. The award recognizes Dale's dedication and commitment to excellence in the training and mentoring of young physiologists and colleagues. APS is pleased to recognize Keisa Mathis (University of North Texas Health Science Center) as the 2016 Awardee.

K. Arthur C. Guyton Teacher of the Year Award

The Arthur C. Guyton Physiology Teacher of the Year Award is selected by the Teaching Section and is supported by Elsevier. This award recognizes a full-time faculty member who has demonstrated excellence in classroom teaching, commitment to the improvement of physiology teaching, and contributions to physiology education at the local community, national, or international levels. This year, the recipient of the Guyton Educator of the Year Award is Nancy Pelaez (Purdue University).

L. Annual Reviews Award for Scientific Reviewing

The Annual Reviews Award for Scientific Reviewing is given for excellence in providing systematic, periodic examinations of scholarly advances, and provoking discussion that should lead to new research activity.

The award recognizes an APS member who has helped to provide an enhanced understanding of physiology through their review articles. The recipient receives an award of $2,000 and travel to attend the EB meeting. APS is pleased to recognize two awardees this year: Barbara Cannon and Jan Nedergaard (Wenner-Gren Institute, Stockholm University).

M. Physiologists in Industry Committee Awards

The Novel Disease Model Awards were established in 1999 and are given to a graduate student and to a postdoctoral fellow submitting the best abstracts describing novel disease models. This award is sponsored by the Physiologists in Industry Committee

and by Novo Nordisk Beijing. The recipient of this year's postdoctoral award is Kavaljit Chhabra (University of Michigan), and the recipient of this year's predoctoral award is Renato Gaspar (Federal University of Maranhao).

N. International Early Career Physiologist Travel Awards

The International Early Career Physiologist Travel Award program was established in 2008 to assist with travel expenses for international early career physiologist who are attending the APS Annual Meeting at EB to present their work. This year's awardees are Thales Barbosa (Fluminense Federal University), Jan Czogalla (University of Zurich), Rodrigo Del Rio (Universidad Autonoma de Chile), Igor Fernandes (Federal Fluminense University), Linda Gallo (Mater Research Institute-University of Queensland), Mohammad Jafarnejad (Imperial College London), Simon Malenfant (Quebec Heart and Lung Institute), Jamie Mayo (University of Melbourne), Aaron Phillips (University of British Columbia), Bethen Phillips (University of Nottingham School of Medicine), and Amin Shah (University of Alberta).

O. Fleur Strand Professional Opportunity Awards

The Fleur L. Strand Award was established to recognize the achievements of a graduate student or postdoctoral fellow, enabling the recipient to attend the EB meeting. The award is named in honor of the late Fleur Strand, formerly Professor Emerita, New York University. Strand was the first to show that stress-evoked hormones such as ACTH can have a direct effect on peripheral systems, independent of the adrenal gland. The award is open to a physiologist working in any area of research. The awardee receives $1,000 and complimentary registration for the EB meeting. APS is pleased to recognize this year's awardee, Matthew Racine (Colorado State University).

P. Steven M. Horvath Professional Opportunity Awards

The Steven M. Horvath Award is given to the top two applications from minority candidates. This award is a reflection of Horvath's long-term commitment to the training of minority physiologists. These awards are made possible by a bequest of the family of Steven M. Horvath. APS is pleased to recognize this year's awardees, Paulo Pires (University of Nevada School of Medicine) and Monica Santisteban (University of Florida).

APS President Patricia Molina and Eugene Shek presents Physiologist in Industry Novel Disease Model Awards to Kavaljit Chhabra and Renato Gaspar

APS President Patricia Molina presents Jack A. Rall with the Orr E. Reynolds Award

APS President Patricia Molina presents the Annual Reviews Award for Scientific Reviewing to Barbara Cannon and Jan Nedergaard

Q. Caroline tum Suden/Frances Hellebrandt Professional Opportunity Awards

The recipients of the Caroline tum Suden awards are selected by the Women in Physiology Committee chaired by Angela Grippo. This year's 52 awards were made possible by the bequests of Caroline tum Suden and Frances Hellebrandt, who were long-time members of the Society. Awards are open to graduate students or postdoctoral fellows, and recipients receive a $500 check and paid registration.

R. Recognition of Outgoing Section Chairs

Merry L. Lindsey (Chair of the Cardiovascular Section), Timothy I. Musch (Chair of the Environmental & Exercise Section), Martha E. O'Donnell (Chair of the Cell and Molecular Physiology Section), Jennifer S. Pollock (Chair of the Water and Electrolyte Homeostasis Section), and Sean D. Stocker (Chair of the Central Nervous System Section) completed their terms at the close of the EB16 meeting. Molina thanked them for their service to their sections and to APS, and presented them with certificates of service.

T. Recognition of Outgoing Committee Chairs

Margaret Anderson (Chair of the Distinguished Physiologist Committee), Gaylen Edwards (Chair of the Animal Care and Experimentation Committee), Kathy Ryan (Chair of the Careers Committee), William Talman (Chair of the Committee on Committee), and J. Michael Wyss (Chair of the Education Committee) completed their terms at the close of the EB16 meeting. Molina thanked them for their service to their respective committees and to APS.

U. Recognition of Outgoing Councillors

Councillors John C. Chatham, M. Harold Laughlin, and Marshall H. Montrose completed their terms at the close of the EB16 meeting. Molina thanked them for their service to the Society and presented them with a certificate.

V. Recognition of Past-President David Pollock

Molina asked the membership to join her in offering a special thank you to our outgoing Past-President, David Pollock, for his hard work and dedication to APS over the past 3 years. She stated that working with Pollock has been educational and inspiring and that Pollock's commitment to the discipline of physiology, the Society, and its members was apparent from her first interaction with him. He was part of the leadership group that visited Havana, Cuba, last spring to establish a Memorandum of Understanding, opening the lines of communication with our colleagues in Havana. He was in his element when meeting with trainees interested in studying hypertension in Havana. Molina said there was one thing that she would like to remember Pollock for and that is his passion, dedication, and persistent effort to improve the Society. He also played an instrumental role in pushing Council to hire Minding Your Business, a strategic company helping to change the perception of the Society. Finally, she stated, even though she is not a renal physiologist, she will always consider him a colleague. In closing, Molina stated that clearly the Society has gained tremendously from Pollock's many contributions to the Society.

In accepting the Society's recognition of his service, Pollock noted what a privilege it had been to serve the members of the APS as their President and that it was certainly a highlight of his professional career. He said it was a pleasure to also shake hands with all the awardees and attend the poster sessions, meet with all the students, and take pictures with them. He stated that the Minding Your Business initiative was essential because physiology is the most important discipline in life science. He also stated that a lot of physicians state that physiology was the most important science they learned while in school, but our scientific world is focused on new methodology and techniques, and that is a problem. "We need to focus on the scientific questions that we are asking, and physiology can answer those questions." He encouraged everyone to

APS President Patricia Molina presents the Presidential Recognition Plaque to David Pollock, APS Past-President

reach beyond their usual colleagues and collaborators, and partner with the various other disciplines in the scientific world, because we can help them in their research endeavors with our knowledge of physiology. He thanked Marty Frank and all the staff at the APS Office. He said that it had been a particular pleasure to work as a member of the Executive Cabinet with the four Presidents with whom his term overlapped: Patricia Molina, Jane Reckelhoff, Kim Barrett, and Sue Barman.

VI. Conclusion

Molina summed up her experience as President as follows: "Life goes on and years change." She thanked the membership for their enthusiastic support. She also thanked Marty and the APS staff for their outstanding dedication, service, and support for her term as President. She said she was humbled by the opportunity granted to her in serving the APS. She encouraged everyone to embrace the challenge of giving back to the Society, protecting its health, and defending the relevance of our discipline, not only in the context of health and disease, but in every-day adaptations.

VII. Passing of the Gavel

Molina then passed the gavel to Jane Reckelhoff (University of Mississippi Medical Center), with her sincere commitment to support Reckelhoff and to work with her to achieve her goals as incoming President of the APS.

VIII. New Business

No new business.

There being no new business, the meeting was adjourned at 6:54 PM, April 5, 2016. ●

Jane F. Reckelhoff
President-Elect

Continued from page 165:

What Does Science Tell us About Resilience: Lessons for Early Career Scientists

rejected papers to experiments that don't work to harsh critical statements by colleagues (and if you have never experienced any of these things, rest assured that someday you will). The four key health habits are to *1)* be active, *2)* sleep, *3)* eat a healthy diet, and *4)* do work that you love and, if possible, with people you like. I will provide some brief evidence in support of each of these.

Be Active

When it comes to being active, two things matter: some level of aerobic physical exercise that gets your heart beating faster and not spending too much time sitting. Exercise can regulate mood, improve cognitive function (at least in older adults), and improve sleep, and in some studies it has been shown to reduce inflammation. I won't have time to say much about sedentarity, but it is now becoming an important issue of interest among scientists. Sedentarity is typically defined as "excessive inactivity" and is often defined by the amount of sitting time or in some studies by the amount of screen time (TV viewing or computer use), and in some studies is measured using accelerometry (for a review, see Ref. 18). Epidemiological evidence in men with sedentary occupations, for example, has shown an increased risk of cardiovascular events (10). Simple exercises like walking have been reported to improve mood symptoms when combined with social support, and forms of movement as diverse as Hatha yoga and African dance were related to decreases in perceived stress and negative affect (see review in Ref. 19). Aerobic fitness training in older adults can enhance cognitive performance, especially on executive function tasks like planning, maintaining focus and resisting distraction, and coordinating complex tasks (6). Exercise can also improve sleep, although this has been mostly shown in epidemiological studies (rather than in randomized controlled trials). For example, in a Japanese study of >3,000 people, those who reported no habitual exercise had an odds ratio (OR) of 1.3 for insomnia [and, by comparison, reporting stress had an OR of 1.8 or being unemployed had an OR of 1.2 (13)]. In a smaller study by Uezu and colleagues where sleep reports were corroborated by actigraphy, those with better sleep also exercised more (27). For a review of epidemiological evidence on this issue, see Youngstedt and Kline (36). [There also have been reports of poorer sleep with very high levels of exercise (36).]

Sleep

To keep pace with the professional goals in your "career race," you also need to keep up good sleep habits. First, this requires keeping relatively regular sleep times, meaning that from day to day you should go to bed and wake up at similar times. Second, limit the amount of any caffeine you ingest and make sure that you stop ingesting any caffeine early enough in the day; the half-life of caffeine is almost 6 hours for healthy individuals (24). Other important sleep habits include keeping the bedroom for sleeping and sex only (i.e., not for work), and ensuring that your bedroom is quiet, cool, and dark. Another useful sleep hygiene tip (from the evidence-based treatment Cognitive Behavioral Therapy for Insomnia) is to get out of bed if you are awake for more than about 20 minutes, do a quiet activity, and then return to bed only when you are drowsy (for a review of the elements of behavioral treatment for insomnia, see Ref. 20). You may also find that some relaxation tools can help you wind down at the end of the day or when you cannot sleep (e.g., guided meditation, progressive muscle relaxation techniques, deep breathing). Critically important for academics, who spend hours at their computers, is to stop viewing a screen (especially if it is bright and close to the face) for 30-60 minutes before bedtime. Otherwise, the screen signals to your brain that you should be awake and works against your getting sound sleep (34).

Better sleep can enhance mood, whereas sleep disturbance can be prodromal to major depression and anxiety, including posttraumatic stress disorder (PTSD; Refs. 5, 17, 21, 26, 35). Less objectively measured sleep time has been related to *1)* increased distress (29), *2)* altered hormones related to appetite and hunger (decreased leptin, increased ghrelin; Refs. 23, 25), and *3)* increased risk of obesity, hypertension, diabetes, and mental health outcomes (9, 28, 30-33). In short, getting more and better-quality sleep can greatly improve your ability to handle academic and work stressors.

Eat a Healthy Diet

Although what is deemed healthy does seem to vary with time as new studies appear, several common themes appear over and over again in epidemiological studies. These include eating proportionally more vegetables and fruits, eating little or no red meat, eating fish, and eating whole grains rather than heavily

refined ones like white flour or white rice. Systemic inflammation is promoted by diets with lots of refined starches and sugars, saturated and trans-fats, few omega-3 fatty acids, and little fiber (for reviews, see Refs. 1, 12). Stress can also increase inflammation and interact with poor diet, as suggested by an older correlational finding (with its usual inferential limitations) that countries whose residents eat more fish also have lower national rates of major depression (11). Finally, stress has been shown to reduce fruit or vegetable consumption in several epidemiological studies (as reviewed in Ref. 12), suggesting that we need to be especially cognizant of our tendency to let good habits slide when we are busy and overworked.

Do Work That You Love With People You Like

So what about the work environment itself? Despite cultural notions about the solitary scientist working hard at the bench (or perhaps even more often, the computer), science, like most other professions, has an important social component. Humans are social creatures who survive and thrive, not just by competing but also by working cooperatively (7, 22). Choose work that interests and excites you because you will spend long hours doing it. Ensure that you have a supportive social network, which preferably includes individuals both in your workplace (e.g., coworkers, lab mates, mentors) and outside it. Once you head your own lab, foster a team mentality that respects, encourages, and supports one another's ideas and productivity. You are in this business for the long-haul, and fostering a cooperative environment in which to work is important for both your individual success and that of the members of your team. Science confirms the importance of building social cohesion with those with whom you work, including evidence of enhanced team performance in cohesive groups (8, 16). Use your social networks wisely as a source of encouragement or moral support, to gain a fresh perspective, to confirm that what you are experiencing is normative, and as a source of new ideas. Talking with peers and colleagues often solidifies and shapes thoughts about our work in ways that suggest a new way forward when we are stuck. An independent evaluation from someone whose judgment you trust also can provide a buffer or reality check that can enable you to keep moving forward. A tip from a senior faculty member that I found especially helpful early in my career was the idea of a "morale folder." Keep a folder on your computer or in hard copy of compliments, nice e-mails, good reviews of papers or grants, and other items that made you feel supported and efficacious. Pull them out to read when you need a reminder that things are not as bad as they seem – or maybe they are, but to remind you that they will get better. Different social networks of which you are a part can serve different supportive roles, so connect with networks that support a few of your most valued identities, whether that is as a scientist, mentor, partner, parent, child, friend, or volunteer. Just be careful to choose these networks wisely since they can take time and be sure they are fulfilling your social needs.

Some Final Take Home Messages

The science of resilience suggests two other important take-home messages that are helpful. George Bonnano of Teachers College, Columbia University, has demonstrated two important findings about resilience to extreme stressors over time in diverse groups of participants. First, his team has showed that the predominant trajectory or pattern of stressful response over time (whether measured as PTSD symptoms, depression symptoms, or reported distress) is a resilient one, regardless of whether you have been deployed to combat in the military (4), experienced a spinal cord injury (3), or had surgery for breast cancer (15) (for review, see Ref. 2). *Take-home message 1* from this work is that, even in the face of major life stressors (what is called a "potentially traumatic event" in this literature), most people weather potentially traumatic events well and do not show prolonged distress reactions. *Take-home message 2* from these data is that those who are resilient to a major life event are those whose pre-event functioning is better. This should provide motivation to heed the tips here even in the face of the busyness of one's academic work life. A set of good behavioral strategies that are well ingrained habits is your best insurance against prolonged or serious distress (or allostatic load in the stress literature; e.g., Ref. 14). In keeping with the marathon analogy, if your functioning is already impaired, you won't be able to deal as well with the unexpected detours that happen in every career.

Thinking of your career as a series of marathons is helpful because it reminds you to take the long view. You've spent many years "training for your races," but that does not mean that any of us will make it through them without the inevitable bumps in the course. By maintaining good health habits – staying active, well rested, well nourished, and establishing a supportive social network – you will be best placed to optimize your function and complete each race. If you don't love your work, think about why, and change what is preventing you from loving it. It is important to work

with people you like (and if you cannot do so in the short-term, at least seek out support and encouragement from mentors, family, friends, and peers whom you trust). By connecting with people, you build the very social networks that can help you to create even better opportunities in the future. Once you have your own lab, ensure that you spend time and effort to make sure that people in the lab feel supported and work together as part of a team. It's important to indicate explicitly that this is a goal of your group and then do the work needed to ensure it happens and be a good role model. If there is good morale in your team, they will be more productive and quite likely be even more creative as a result. As the lab head, you help to create the buffer against stressors that your research team needs to perform at its best. Following these tips may not be easy, but the best evidence is that consistently engaging in these more healthful behaviors as part of your career "plan of action" will reap the best rewards in the long-term. ●

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Association of Chairs of Departments of Physiology 2015 Survey Results

We continue to encourage more of our colleagues to respond so that we can have more robust data that will benefit all.

The data provide the reader with general trends of faculty demographics and distribution, overall departmental budgets, and space available for research. As a reminder, beginning in 2004, ACDP decided not to include faculty salary information in this report. AAMC salary data is more generally used, so the ACDP Council decided to no longer collect or report this data.

Data were collected on tenure status, gender, and ethnicity of faculty members (Table 1). Table 1 also includes information on the average number of student contact hours for faculty in the lab, classroom and small discussion groups and the type of teaching interactions for the department (MD/DO, DVM, allied health, etc.). Also included is information on the type of medical physiology course being taught (note that departments teach multiple class types, accounting for the fact that the numbers do not add up to the total respondents).

Table 1a. Faculty Summary

Faculty Summary (*n* = 911)	Male	Female	Total
Asian/Pacific Islander	98	34	132
Black (not Hispanic)	5	0	5
Native American	5	2	7
Hispanic	38	12	50
White (not Hispanic)	488	161	649
Foreign National	33	12	45
Not identified	2	2	4
Total	**669**	**223**	**892**
Gender or race/ethnicity not identified			19

For your faculty, what is the average number of hours of student contact (per year) for:	Student Type	Average (hours)	Number (inst.)
Lab Hours	Graduate	358	39
	Medical	46	41
	Other	115	29
Lectures	Graduate	99	46
	Medical	42	46
	Other	102	34
Small Group	Graduate	34	42
	Medical	21	46
	Other	24	29

Medical Physiology Course Type	Yes	No	Total Responded
Integrated Disciplines	39	11	50
Traditional	23	27	50
Within Traditional	36	14	50

Teaching Interactions (*n* = 55 departments)	
MD/DO	46
DDS	15
DVM	5
Allied Health	22
Pharmacy	8
Other Biomedical	35
Life Science	26
Bioengineering	23
Other	17

Tenure Status in Each Department by Degree	Tenured	Not Tenured	Not Eligible	Not Identified	Total
MD	13	11	15		39
PhD	545	139	119	2	805
2 Doctorates	41	8	14		63
Other	0	0	4		4
Total	**599**	**158**	**152**	**2**	**911**

Table 2 focuses on student/trainee information. Included is information on the gender and number of U.S. citizen/resident alien vs. foreign pre- and postdoctoral students, gender and ethnicity of the U.S. citizen/resident alien predoctoral and postdoctoral fellows, and gender and country of origin of the foreign predoctoral and postdoctoral fellows. Also shown are the number of predoctoral trainee completions by gender, the number

Table 2. Student/Trainee Summary

Student/Trainee Summary

	Predoctoral		Postdoctoral	
	Male	Female	Male	Female
US Citizen/ Resident Alien	351	307	144	138
Foreign	90	123	147	123
Total	**441**	**430**	**291**	**261**

Race/Ethnicity of US Citizen/Resident Alien Pre- and Postdoctoral Students/Trainees

	Predoctoral		Postdoctoral	
	Male	Female	Male	Female
Native American	3	1	2	2
Asian/Pacific Islander	41	35	26	34
Black (not Hispanic)	20	32	9	8
Hispanic	21	27	14	15
White (not Hispanic)	266	212	93	79
Total	**351**	**307**	**144**	**138**

US Citizen/Resident Alien Predoctoral Trainee Completions

	Male	Female
Native American	1	1
Asian/Pacific Islander	10	12
Black (not Hispanic)	6	8
Hispanic	8	13
White (not Hispanic)	58	51
Total	**83**	**85**

Total Predoctoral Trainee Completions During the Year Ending June 30, 2015

	Total
Female	118
Male	101
Total	**219**

Foreign National Predoctoral Trainee Completions

	Male	Female
African	1	1
Asian/Pacific Islander	8	17
Central/South American	1	7
European/Canadian, etc.	4	6
Middle Eastern	3	2
Other	1	0
Total	**18**	**33**

Number of Foreign Pre- and Postdoctoral Students/ Trainees

	Predoctoral		Postdoctoral	
	Male	Female	Male	Female
African	2	4	2	0
Asian/Pacific Islander	50	68	92	56
Central/South American	8	9	13	15
European/Canadian, etc.	14	22	27	39
Middle Eastern	15	20	8	6
Other	1	0	5	7
Total	**90**	**123**	**147**	**123**

Number of Foreign Pre- and Postdoctoral Trainees Whose Primary Source of Support is:

	Predoctoral	Postdoctoral
Institutional	73	34
Research Grants	73	189
Private Foundations	5	21
Home (foreign) Government	12	12
Other	17	12
Total	**180**	**268**

Average Annual Stipend ($U.S.)

	Average	Number (inst.)
Postdoctoral	$42,670	45
Predoctoral	$25,497	47

of U.S. citizen/resident alien predoctoral completions by gender and ethnicity, and the number of foreign predoctoral completions by gender and country of origin. The type of support that is used for foreign pre- and postdoctoral students is included, as are the average stipends paid to all pre- and postdoctoral students by the departments.

Institutional information is provided in Table 3 in terms of the type of institution (public or private) and the average square footage of space occupied by the departments for research, teaching, administration, and other purposes.

Departmental budget information (Table 4) shows average dollar amounts for type of support (institutional hard money, research grants, training grants, endowments, indirect cost recovery). Numbers for all institutions are reported, as are the data broken out by public medical, private medical, and non-medical. Financial information is also given, including fringe benefit rate, federally negotiated indirect cost rates for both on and off campus, allocated salary dollars from grants directly returned to the departments, percentage of indirect costs returned to the departments, percentage of total faculty salaries derived from research grants, and percentage of faculty having extramural research funding greater than $100,000/yr.

Table 5 ranks responding Institutions according to their total dollars (institutional hard money, research grants, etc.), research grant dollars (direct or direct plus indirect, as appropriate), research dollars per faculty member, departmental research space, and research dollars per research space. Total number of faculty in each department is also shown.

For an update of AAMC salary data, please see the accompanying article (p. 185). ●

Table 3. Institution Summary

Type of Institution	
Private	14
Public	41
Total	**55**

Space Controlled by Department		
	Average, sq. ft.	**No. of Depts**
Research Space	20,121	50
Administrative Space	3,472	48
Teaching Space	1,524	43
Other Space:	1,983	37
Total Space	**26,232**	**50**

Table 4. Institutional Financial Information

Budget by Institution

	All Institutions	No. of Depts	Mean No. of Faculty	Private Medical	No. of Institutions	Mean No. of Faculty
Institutional (hard money, e.g, operating costs, state allocations)	$2,261,766	50	18	$2,188,640	12	14
Outside Research Grants and Contracts (direct costs only)	$4,090,291	48	19	$5,961,549	10	15
Training Grants (direct costs only)	$347,597	21	20	$315,515	6	16
Endowments	$411,180	35	18	$479,043	9	14
Indirect Cost Recovery (amount returned to your department)	$385,725	35	20	$2,521,829	3	20
Other Budget Support	$526,995	28	18	$850,251	6	14
Average Departmental Budget	**$7,151,729**	**50**		**$8,729,220**	**12**	
Total faculty			**911**			**167**

	Public Medical	No. of Institutions	Mean No. of Faculty	Non-medical	No. of Institutions	Mean No. of Faculty
Institutional (hard money, e.g, operating costs, state allocations)	$2,306,240	36	20	$1,900,000	2	16
Outside Research Grants and Contracts (direct costs only)	$3,737,936	36	20	$1,076,383	2	16
Training Grants (direct costs only)	$360,430	15	22	$0		
Endowments	$401,170	25	20	$50,659	1	21
Indirect Cost Recovery (amount returned to your department)	$185,465	32	20	$0		
Other Budget Support	$438,835	22	19	$0		
Average Departmental Budget	$6,905,272	36		$3,001,713	2	
Total Faculty			**708**			**31**

Financial Information

	Average, %	No. of Institutions
Current fringe benefit rate most frequently used for primary faculty	31	48
Federally negotiated indirect cost rate for FY 13-14 off campus	28	44
Federally negotiated indirect cost rate for FY 13-14 on campus	51	47
Percentage of allocated salary dollars from grants directly returned to your department	69	32
Percentage of indirect costs returned to your department	20	32
Percentage of total faculty salaries derived from research grants (does not include fringe benefits costs)	34	44
Percentage of faculty having extramural research funding greater than $100,000/year	53	47

Table 5. Complete Ranking According to Total Dollars

Rank Total Dollars	Total Dollars	Rank Research Grant Dollars	Research Grant Dollars	Rank Research Dollars/Faculty	Research Dollars/ Faculty	Rank Total Research Space	Total Research Space	Rank Research Dollars/sqft	Research Dollars/sqft	No. of Faculty
1	29,959,152	1	17,615,981	1	880,799	2	46,152	3	382	20
2	18,291,498	2	10,823,498	2	569,658	6	36,042	9	300	19
3	17,966,893	4	9,496,468	16	249,907	8	34,591	12	275	38
4	13,996,661	5	9,458,702	7	378,348	3	43,151	17	219	25
5	13,134,029	6	8,516,709	6	425,835	13	26,926	7	316	20
6	12,588,462	3	10,127,061	5	440,307	5	36,048	11	281	23
7	11,612,920	8	7,500,000	25	197,368	45	10,414	2	720	38
8	11,076,188	11	5,621,930	13	295,891	4	38,634	29	146	19
9	11,074,100	13	4,818,000	39	112,047	10	33,170	30	145	43
10	10,187,869	7	7,885,987	11	342,869	12	27,510	10	287	23
11	10,150,434	9	6,525,071	4	466,077	22	18,811	5	347	14
12	9,365,497	10	5,957,015	3	496,418	9	33,369	24	179	12
13	8,040,414	15	4,373,054	27	174,922	19	20,220	18	216	25
14	7,934,542	21	3,366,952	23	198,056	25	16,975	20	198	17
15	7,589,346	16	4,287,793	8	357,316	32	13,500	6	318	12
16	7,324,568	12	5,303,335	12	311,961	48	5,640	1	940	17
17	7,052,872	31	2,572,663	24	197,897	16	22,095	35	116	13
18	7,024,467	17	3,959,602	35	127,729	18	20,870	21	190	31
19	6,946,454	19	3,482,020	18	232,135	11	31,313	36	111	15
20	6,346,174	20	3,478,643	9	347,864	27	16,729	19	208	10
21	6,246,572	29	2,627,396	17	238,854	1	49,427	47	53	11
22	6,244,328	23	3,163,262	30	150,632	15	22,163	31	143	21
23	6,163,209	14	4,545,096	29	156,727	28	15,065	8	302	29
24	6,093,981	38	1,832,470	44	65,445	14	24,166	45	76	28
25	6,053,089	30	2,575,626	31	143,090	7	35,377	46	73	18
26	6,006,594	22	3,197,136	34	127,885	30	14,492	16	221	25
27	5,489,050	35	2,094,064	28	161,082	42	11,600	23	181	13
28	5,351,793	42	1,634,620	38	116,759	24	18,355	41	89	14
29	5,294,458	34	2,122,028	32	132,627	37	12,484	25	170	16
30	5,274,406	25	2,943,180	21	210,227	41	11,623	13	253	14
31	5,206,000	28	2,694,000	20	224,500	26	16,900	27	159	12
32	5,090,196	40	1,738,147	43	69,526	20	19,971	42	87	25
33	4,672,039	33	2,228,972	33	131,116	17	21,368	38	104	17
34	4,592,662	27	2,717,196	19	226,433	21	19,848	32	137	12
35	4,349,193	18	3,820,279	10	347,298	46	10,100	4	378	11
36	4,325,324	24	3,114,520	14	259,543	31	14,000	15	222	12
37	4,262,468	41	1,734,245	36	123,875	29	14,774	34	117	14
38	4,251,048	45	1,107,996	45	65,176	34	13,227	43	84	17
39	3,962,069	37	1,903,442	46	63,448	38	12,475	28	153	30
40	3,865,988	36	2,023,450	37	119,026	39	12,048	26	168	17
41	3,850,766	32	2,279,513	22	207,228	36	12,507	22	182	11
42	3,813,002	26	2,772,748	15	252,068	43	11,236	14	247	11
43	3,800,000	39	1,800,000	26	180,000	33	13,394	33	134	10
44	3,797,659	44	1,146,133	47	45,845	44	10,555	37	109	25
45	3,042,987	43	1,173,769	41	106,706	40	11,671	39	101	11
46	2,600,500	46	1,000,000	40	111,111	35	12,800	44	78	9
47	2,203,425	48	352,766	48	16,798	23	18,500	48	19	21
48	1,993,394	47	821,419	42	91,269	47	8,289	40	99	9
49	1,220,000	49	0	49	0	49	2,975	49	0	7
50	807,721	50	0	50	0	50	2,488	50	0	6

AAMC Medical School Faculty Compensation Survey

Each year, the American Association of Medical Colleges (AAMC) surveys all U.S. medical schools as to faculty compensation. Because of this, the ACDP (see associated article on p. 165) decided to no longer collect the same data from its members.

As a supplement to the ACDP survey, the AAMC has agreed to allow the APS to publish selected results from their survey.

Table 1 shows the regional distribution of medical schools responding to the AAMC survey in terms of public medical and private medical. Also shown is the number of physiology departments in those regions that responded. The number of departments responding to the AAMC survey is not the same as the ACDP survey, since AAMC usually receives a much greater response from institutions.

Summary statistics on faculty compensation in physiology departments for PhD and MD faculty are given in Table 2. Table 3 shows the changes in salary that have occurred over the past 3 years for both PhD and MD faculty. The summary statistics for separate regions of the country for both PhD and MD faculty are given in Table 4.

Table 5 shows the salary comparison between faculty in all basic science departments vs. those in physiology departments.

Table 1. Distribution of Medical Schools Responding to AAMC Medical School Faculty Compensation Survey

		Northeast	Midwest	South	West	TOTAL
All	Private Medical	27	12	14	4	57
	Public Medical	13	22	37	15	87
Physiology	All Medical Schools	16	12	22	11	61

Table 2. Summary Statistics on Physiology Department PhD and MD Faculty Compensation

PhD Faculty						
		25th	Median	75th	Mean	No. of Faculty
Chair	All Schools	234,000	276,000	326,000	284,900	61
	Medical Public	230,000	267,000	306,000	265,500	42
	Medical Private	235,000	304,000	360,000	327,700	19
Professor	All Schools	138,000	165,000	194,000	171,200	529
	Medical Public	138,000	165,000	190,000	171,600	369
	Medical Private	138,000	166,000	201,000	170,200	160
Assoc. Prof.	All Schools	102,000	115,000	131,000	117,400	321
	Medical Public	101,000	115,000	128,000	115,600	231
	Medical Private	104,000	115,000	143,000	122,100	90
Asst. Prof.	All Schools	67,000	88,000	100,000	85,600	356
	Medical Public	65,000	88,000	97,000	84,400	247
	Medical Private	68,000	89,000	105,000	88,300	109
Instructor	All Schools	48,000	52,000	58,000	53,300	71
	Medical Public	48,000	51,000	57,000	51,800	51
	Medical Private	50,000	55,000	67,000	57,000	20

Table 2. Summary Statistics on Physiology Department PhD and MD Faculty Compensation (continued)

MD Faculty						
		25th	Median	75th	Mean	No. of Faculty
Chair	All Schools	295,000	340,000	401,000	345,400	12
	Medical Public	292,000	309,000	388,000	338,600	7
	Medical Private	178,000	367,000	526,000	355,000	5
Professor	All Schools	156,000	183,000	230,000	193,300	63
	Medical Public	160,000	186,000	231,000	194,200	32
	Medical Private	153,000	180,000	217,000	192,500	31
Assoc. Prof.	All Schools	89,000	106,000	125,000	110,100	30
	Medical Public	89,000	105,000	122,000	106,800	14
	Medical Private	90,000	111,000	134,000	112,900	16
Asst. Prof.	All Schools	70,000	92,000	103,000	88,800	26
	Medical Public	70,000	83,000	98,000	82,800	16
	Medical Private	90,000	97,000	107,000	98,400	10
Instructor	All Schools	48,000	53,000	61,000	54,200	5
	Medical Public					4
	Medical Private					1

For less than 5 faculty, data are not reported

Table 3. Change in Total Compensation for Physiology Department PhD/MD Faculty

PhD Faculty							
2014 - 2015		2013 - 2014		2012 - 2013		% Change 2013 - 2014 to 2014 - 2015	
Mean	Median	Mean	Median	Mean	Median	Mean	Median
131,600	122,000	129,100	119,000	126,700	118,000	1.9	2.5

Mean and median values were combined for Assistant, Associate, and Professor

MD Faculty							
2014 - 2015		2013 - 2014		2012 - 2013		% Change 2013 - 2014 to 2014 - 2015	
Mean	Median	Mean	Median	Mean	Median	Mean	Median
149,500	143,000	149,900	134,000	147,200	134,000	-0.3	6.7

Mean and median values were combined for Assistant, Associate, and Professor

Table 4. Summary Statistics on Physiology Department PhD and MD Faculty Compensation by Region

PhD Faculty					
		Northeast	Midwest	South	West
Chair	25th	235,000	238,000	224,000	214,000
	Median	277,000	276,000	258,000	281,000
	75th	323,000	349,000	319,000	328,000
	Mean	298,200	310,200	267,300	272,900
	Total faculty	15	13	24	9
Professor	25th	146,000	137,000	130,000	151,000
	Median	171,000	166,000	157,000	176,000
	75th	195,000	199,000	184,000	205,000
	Mean	170,700	173,500	161,600	188,700
	Total faculty	101	156	188	84
Assoc. Prof.	25th	111,000	98,000	97,000	111,000
	Median	122,000	115,000	110,000	120,000
	75th	144,000	130,000	124,000	137,000
	Mean	128,000	115,700	112,200	119,100
	Total faculty	69	106	116	30
Asst. Prof.	25th	73,000	63,000	68,000	78,000
	Median	97,000	87,000	85,000	94,000
	75th	110,000	97,000	95,000	107,000
	Mean	90,400	83,800	83,300	94,600
	Total faculty	54	109	160	33
Instructor	25th	50,000	42,000	48,000	48,000
	Median	55,000	52,000	51,000	55,000
	75th	66,000	60,000	56,000	58,000
	Mean	58,900	51,200	52,200	53,100
	Total faculty	10	11	30	20

MD Faculty					
		Northeast	Midwest	South	West
Chair	25th			290,000	
	Median			303,000	
	75th			380,000	
	Mean			288,800	
	Total faculty	2	3	6	1
Professor	25th	161,000	156,000	128,000	160,000
	Median	193,000	181,000	172,000	172,000
	75th	239,000	217,000	224,000	204,000
	Mean	202,300	186,300	182,600	187,800
	Total faculty	30	6	15	12
Assoc. Prof.	25th	86,000	108,000	76,000	
	Median	103,000	142,000	92,000	
	75th	107,000	156,000	116,000	
	Mean	101,800	133,700	96,200	
	Total faculty	6	9	12	3

Table 4. Summary Statistics on Physiology Department PhD and MD Faculty Compensation by Region (continued)

		Northeast	Midwest	South	West
Asst. Prof.	25th		83,000	70,000	
	Median		95,000	73,000	
	75th		101,000	102,000	
	Mean		93,800	82,500	
	Total faculty	2	12	12	0
Instructor	25th				
	Median				
	75th				
	Mean				
	Total faculty	1	1	1	2

For less than 5 faculty, data are not reported

Table 5. Salary Comparison Between All Basic Science Departments and Physiology Departments

		All Basic Science Depts.	Physiology
Chair	25th	235,000	234,000
	Median	282,000	276,000
	75th	338,000	326,000
	Mean	290,800	284,900
	Total faculty	540	61
Professor	25th	143,000	138,000
	Median	172,000	165,000
	75th	210,000	194,000
	Mean	182,600	171,200
	Total faculty	4,350	529
Assoc. Prof.	25th	102,000	102,000
	Median	118,000	115,000
	75th	136,000	131,000
	Mean	121,900	117,400
	Total faculty	3,418	321
Asst. Prof.	25th	77,000	67,000
	Median	94,000	88,000
	75th	108,000	100,000
	Mean	94,200	85,600
	Total faculty	4,026	356
Instructor	25th	53,000	48,000
	Median	59,000	52,000
	75th	68,000	58,000
	Mean	64,200	53,300
	Total faculty	654	71

APS News

The APS International Opportunity Program Symposium

The APS International Opportunity Program (IOP) Symposium "East Meets West: Advances in Gut Microbiome Effects on Pathophysiology of Human Diseases" was held in Yangzhou University, China, on March 5-6, 2016. This was the first APS IOP symposium in China. Jun Sun, Associate Professor from the University of Illinois at Chicago (UIC), organized and chaired the meeting.

Researchers from UIC (Jun Sun and Pradeep Dudeja, APS members) and researchers and students from Yangzhou University, Shanghai Jiaotong University, Nanjing Medical University, Chongqing Medical University, Haerbing Medical University, Institut Pasteur of Shanghai, and Zhejiang A&M University participated in the symposium. This symposium offered presentations and discussion on the most recent progress in mechanisms of microbial host interactions in human diseases, including digestive disorders, obesity, autism, and cancer. Eleven research talks were given by established researchers. Six awards were given to students with excellent presentations and abstracts. There were over 40 student attendees.

Topics explored included how gut microbiome increases susceptibility to GI diseases and diseases in distant organs, and how to facilitate the understanding of mechanisms that maintain a healthy host-microbiota relationship. Chinese researchers and students learned new concepts and advances in the field. The mission of the APS international committee was carried out, which enhanced the impact and awareness of the APS in China. Also highlighted were the benefits of APS membership for faculty and trainees.

The meeting successfully achieved its original goals. Many Chinese PIs and students express their interests to become APS members, publish in the APS journals, and attend the APS meetings. Beyond the original plan, much was learned about the progress of microbiome in clinical practice and veterinary medicine in China. Also discussed were the global microbiome project, microbes in animals, humans, and environment, and the IOP's mission to educate and train the next generation of researchers. Researchers and PIs also asked for future joint symposia that could then be planned in the near future.

Group picture on *day 1*

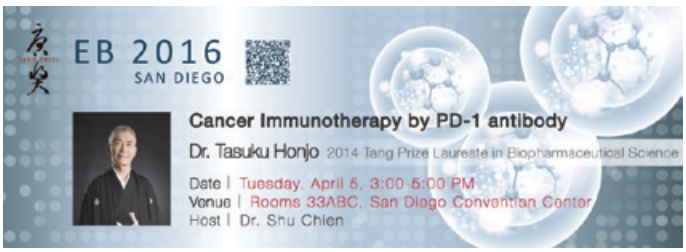
Organizers and Award Committee (from *left* to *right*): Qiuchun Li, Jun Sun, Pradeep Dudeja, Xinan Jiao, and Xiulong Xu

Some comments from the student attendees:

"Thank you very much to organize the APS microbiome meeting in Yangzhou University. As a member of YZU, it was my great pleasure to do some support work for the meeting. Importantly, I learned research progress on microbiome and human disease, especially in clinical from the wonderful reports presented during the meeting. Also, it was pleasure for me to meet with so many new friends in the meeting."
–Chuang Meng, PhD student, Yangzhou University

"That was an exciting meeting, let me benefit a lot, and hope for more opportunity to attend similar meetings of APS."
–Xinxia Chang, Student, Nanjing Medical University ●

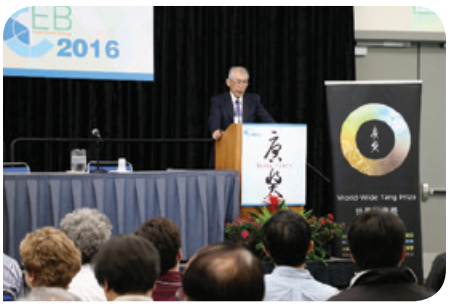
Tang Prize Summary Report of EB2016



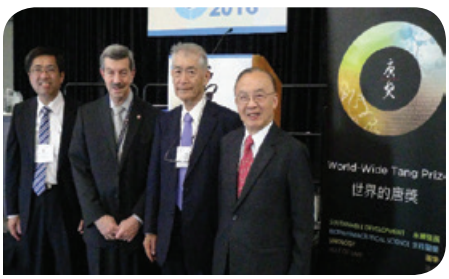
In its second year of 10 in promoting education in biology, the Tang Prize Lecture series at Experimental Biology took place on April 5, 2016, in San Diego. There, the 2014 Tang Prize Laureate in Biopharmaceutical Science Tasuku Honjo addressed an audience of 300+ on cancer immunology and his work on the inhibitory receptor PD-1. Shu Chien (National Medal of Science awardee and director of the Institute of Engineering in Medicine at UC San Diego) hosted the event, with Jenn-Chuan Chern representing the Tang Prize Foundation as its CEO. Martin Frank (Executive Director of the American Physiological Society) also participated this event.

The Tang Prize Lecture at Experimental Biology is delivered yearly or bi-yearly by recent recipients of the Tang Prize in Biopharmaceutical Science. It is intended to build on the foundation of the prize field by giving it a real-world platform for the sharing of new and forward-looking ideas among the world's scientific community. The first year of the Tang Prize Lecture series was delivered by James P. Allison on a separate immune mechanism, the inhibitory receptor CTLA-4. Honjo and Allison are two of the five inaugural laureates of the Tang Prize. ●

Shu Chien (*right*) hosted the lecture of Tasuku Honjo (*left*)



Tasuku Honjo in lecture



Left to *right:* Jenn-Chuan Chern (CEO of Tang Prize Foundation), Martin Frank(Executive Director of the APS), Tasuku Honjo, Shu Chien

Audience in the lecture

Group photo of participants from Taiwan with Tasuku Honjo

Participants queued to talk with Tasuku Honjo after the lecture

Science Policy

APS and FASEB Showcase NSF-Funded Research

APS and FASEB co-sponsored an exhibit at an April 27, 2016 Coalition for National Science Funding event on Capitol Hill. APS member Allyson Hindle presented her research on naturally occurring protection for the hearts and brains of diving seals in Antarctica to an audience that included Members of Congress and Congressional staff. The exhibit was meant to highlight the value of NSF-funded research and to make the case for future budget increases. ●

Hannah Carey, Rebecca Osthus, Ben Krinsky, and Allyson Hindle at the 2016 Coalition for National Science Funding Exhibition

APS Early Career Advocacy Fellows go to Capitol Hill

On May 17, 2016, the APS Early Career Advocacy Fellows convened in Washington, DC to meet with their members of Congress. The Fellows, accompanied by members of the APS Science Policy Committee and staff, discussed the importance of federal funding for research, as well as pending reauthorization for the Small Business Innovation Research program.

The 2-year fellowship program offers early career physiologists the opportunity to become engaged in the Society's policy and advocacy efforts under the mentorship of the Science Policy Committee.

Hindle, Evans, and Science Policy Committee Chair Kevin Kregel brave the rain to advocate for research funding on Capitol Hill

APS Early Career Advocacy Fellows Heidi Medford, LaShauna Evans, Giovanna Collu, and Allyson Hindle

Kregel, Evans, and Hindle get ready to meet with staff from Senator John Cornyn's office

Collu, Medford, and McCabe outside the office of Representative Charles Rangel

Collu, Medford, and incoming Science Policy Chair Laura McCabe on their way to the Senate to discuss research funding with the New York and Washington state delegations

APS Advises USDA on Ways to Reduce Regulatory Burden

On January 26, 2016, the USDA solicited input on how it can make its regulatory oversight less burdensome. This request for information was part of a government-wide review mandated by the White House to identify ways that federal agencies can save time and money consistent with their program objectives.

Below are excerpts from the statement the APS submitted concerning two ways USDA can reduce the administrative burden associated with Animal Welfare Act oversight while still maintaining high animal welfare standards. The full APS statement is available online at *http://www.the-aps.org/USDARegulatoryRFI2016*.

Modify the Emphasis of the Alternatives Search Requirement

The current regulatory approach for the alternatives search requirement is an inefficient and burdensome process. §2143(a)(3)(B) of the Animal Welfare Act (AWA) states that researchers must consider "alternatives to any procedure likely to produce pain or distress in an experimental animal." USDA's Animal Care Policy #12 favors the use of database searches to demonstrate that alternatives have been considered. However, as noted in comments the APS submitted in 2015 concerning the reduction of regulatory burden, such search "requires significant effort on the part of the investigator while providing little insight into the investigator's actual consideration of alternative strategies" (see *http://www.the-aps.org/USDARegulatoryRFI*).

We concur with the comments submitted by the Association of American Universities, the Association of Public and Land-grant Universities, and the Council on Government Relations regarding this point. Their letter recommends that USDA "identify alternatives to the literature search that would reduce unnecessary administrative work while meeting the intent of the regulations." The APS recommends that the emphasis on database searches in Policy #12 be eliminated, permitting investigators to provide a brief written narrative addressing how reduction, refinement, and/or replacement were incorporated into the protocol if they prefer. As we noted in our 2015 comments: "Such a narrative gives the review body (IACUC) much more insight into the consideration of alternatives, satisfies the regulatory objectives of the Animal Welfare Act, and reduces burden for researchers."

Extend the Review Period for Activities Involving Animals

The current system for overseeing the care and use of research animals is unduly complex because it is governed by multiple federal agencies with different policies. The National Academies of Sciences (NAS) examined the problem in their 2015 report, "Optimizing the Nation's Investment in Academic Research." The report recommends "a unified federal approach for the development, promulgation, and management of policies and regulations pertaining to the care and use of research animals."

In terms of modifications that are feasible without a change to the AWA, we urge USDA to harmonize its requirement for periodic reviews of protocols to align with the PHS Policy. Currently, Section 2.31 (d)(5) of the Animal Welfare Regulations states, "The IACUC shall conduct continuing reviews of activities covered by this subchapter at appropriate intervals as determined by the IACUC but not less than annually." Section IV, C, 5 of the PHS Policy takes a different approach: "The IACUC shall conduct continuing review of each previously approved, ongoing activity covered by this Policy at *appropriate intervals as determined by the IACUC*, including a complete review in accordance with IV.C.1-4 at least once every three years" (emphasis added). Keeping track of different review timetables for two different oversight agencies is burdensome. The APS therefore urges USDA to utilize language similar to that of the PHS Policy with respect to the frequency of reviews.

Extending the period for reviewing protocols to 3 years would significantly reduce burden while still fulfilling the intent of the AWA. ●

ACE Symposium Seeks Ways to Reduce Regulatory Burden

The Animal Care and Experimentation (ACE) Committee presented a symposium at Experimental Biology 2016 to address concerns about the local regulation of animal care programs. As noted by the four speakers, burdensome institutional policies can be a source of frustration for investigators, especially when the policies go beyond regulatory requirements. Poor communication between IACUCs and investigators is another significant source of problems.

Featured Speakers

ACE Committee Chair **Jeffrey Henegar** of the University of Missouri highlighted the federal laws and regulations governing oversight of research animals. These agencies have separate requirements for animal care that "overlap and, at times, contradict each other sometimes causing confusion for IACUCs and institutions." One example of contradictory requirements is the fact that the AWA requires IACUCs to have at least three members, whereas the PHS Policy requires a minimum of five. He also noted that, when the distinction between recommendations and regulations is unclear, institutions may take an unnecessarily burdensome approach to oversight to protect themselves.

Anthony Comuzzie of the Texas Biomedical Research Institute (TBRI) pointed out that improving IACUC efficiency requires a willingness to review existing policies, such as collecting only the information that is needed to report animal activities to agencies. It also requires recruiting qualified and engaged IACUC members. To illustrate how this process can help, Comuzzie listed some of the changes his IACUC made to its policies. These included using designated member review rather than full committee review whenever possible; streamlining the protocol form to eliminate unnecessary data requests; and referencing standard operating procedures (SOPs) for routine animal procedures instead of including all the information in the protocol. By eliminating unnecessary and burdensome requirements, more time could be dedicated to animal care rather than administrative work.

J. R. Haywood of Michigan State University reviewed a number of recent studies on the problem of regulatory burden. He highlighted the recommendations of reports by the National Science Board (NSB) and the National Academy of Sciences (NAS). These included calls to eliminate or modify ineffective regulations; reexamine the federal oversight system on animal use and care; and increase the efficiency and effectiveness of institutional policies. Haywood also discussed ways IACUCs can rein in self-imposed regulatory burden by assessing whether their internal procedures are actually required by law and whether they in fact improve the welfare of animals. After that, the IACUC should also consider whether the procedure can be conducted in a more efficient or cost-effective manner and then decide whether to change, continue, or stop the practice. This systematic approach was first described in "Avoiding an Overzealous Approach: A Perspective on Regulatory Burden," an article by Haywood and Greene that was published in the *ILAR Journal* in 2008.

Barbara Hansen of the University of South Florida suggested ways to resolve various problems that can arise. She encouraged the use of a review process when concerns about animal welfare are raised and recommended developing procedures to help resolve disagreements between investigators and the IACUC. Her suggestions included having another institution's IACUC review disagreements about possible animal welfare issues or consulting with outside experts to resolve disagreements. Doing so will provide a secondary review of animal welfare or protocol design issues. She also recommended that IACUCs refrain from reporting every concern that is raised for discussion as a non-compliant issue.

The speakers' presentations and other resources on reducing regulatory burden are available at *the-aps.org/ReducingBurden*. ●

Antibody Producer Settles USDA Case, Relinquishes AWA Credentials

On May 19, 2016, antibody producer Santa Cruz Biotechnology (SCBT), Inc. reached an agreement with the USDA to resolve allegations of numerous Animal Welfare Act (AWA) violations. Under the terms of this agreement, SCBT neither admitted nor denied wrongdoing. Nevertheless, the company agreed that by May 31, 2016 it would pay a record $3.5 million fine. SCBT also agreed that, as of May 31, 2016, it would cease antibody production involving USDA-regulated species and relinquish its registration as a research facility. SCBT further agreed to allow USDA to revoke its license as a dealer as of December 31, 2016, after which it can no longer sell antibodies made from USDA-regulated species.

USDA filed three formal complaints against SCBT between July 12, 2012 and August 7, 2015 based on the observations of inspectors from the agency's Animal and Plant Health Inspection Service (APHIS) during multiple unannounced visits. The USDA complaints alleged that the company repeatedly violated the AWA in its treatment of goats used for antibody production. [For more about the USDA's case against SCBT, see Caveat Emptor (*http://www.the-aps.org/mm/Publications/Journals/Physiologist/Archive/2016-Issues/January-2016-Vol-59No-1/Caveat-Emptor*).] The complaints included allegations that SCBT failed to provide appropriate veterinary care to sick and injured animals; that its staff handled animals improperly; and that the company's institutional animal care and use committee failed to ensure that animals were housed under appropriate conditions and that the animals' pain and distress were minimized during antibody production. In its third complaint dated August 7, 2015, USDA also alleged that SCBT "demonstrated bad faith by misleading APHIS personnel about the existence of an undisclosed location where respondent housed regulated animals." This "undisclosed location" was a barn where some 841 goats – including sick ones – were housed.

SCBT initially contested the USDA's allegations and sought a hearing before an administrative law judge. After several delays, a hearing where both sides could present evidence took place August 18-20, 2015 before Administrative Law Judge Janice Bullard. The hearing was suspended on the morning of August 21 with no explanation given. It was later scheduled to resume on April 5, 2016 and then postponed again until August 15, 2016.

The settlement agreement gives SCBT until the end of 2016 – when its license will be revoked – to sell antibodies made from blood and serum it collected from regulated animals prior to August 21, 2015. However, SCBT had to stop producing antibodies from this blood and serum by May 31, 2016, when it agreed to cancel its registration as a research facility. Since the AWA does not regulate rodents bred for research, SCBT can continue to sell antibodies produced in mice.

Antibodies play an important role in both clinical medicine and research because they react to the presence of specific proteins. Antibody production starts by injecting an animal with a protein. This activates the immune system, which generates antibodies to identify the invading protein. Some types of antibodies are purified directly from blood collected from animals injected with a protein. Other types can be produced in a laboratory, with cell lines created by fusing an initial batch of purified antibodies to harmless cancer cells. Antibodies target either one region of a protein (monoclonal antibodies) or several regions (polyclonal antibodies).

Why did the SCBT case take almost 4 years to settle? From a legal perspective, APHIS inspections findings represent allegations of AWA violations, and our system guarantees due process: Those accused of violating the law are entitled to their day in court. Kudos should go to USDA for its persistence in marshalling sufficient evidence to convince SCBT to agree to this settlement. ●

Education

Members Foster Physiology Discovery at the 2016 USASEF

Jeffrey Osborn, University of Kentucky
Margaret E. Stieben, Program Manager, K-12 Education Programs

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 the Education Office.

At the APS booth, seven members worked each day to engage thousands of attendees in hands-on physiology activities. Education Committee members included 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.

Cub Scouts learning about blood flow

Member volunteers Albino, Taylor, Halpin, and Andrisse

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.

In the "Healthy Heart Pumping Race" (Pressley TA, Limson M, Byse M, Matyas ML. The Healthy Heart Race: a short-duration, hands-on activity in cardiovascular physiology for museums and science festivals. *Adv Physiol Ed* 35: 275-279, 2011) participants explored a model of blood flow and the effects of atherosclerosis, unhealthy diets, and lack of exercise. The model was constructed with a unidirectional marine gas pump and tubing that circulated fluid (water with red food coloring) from a reservoir into a graduated jug. When resistance was increased (the tube was clamped) to demonstrate occluded arteries, the pump was more difficult to squeeze, and the time to fill the jug was longer. Participants could easily feel the additional effort exerted by the "heart" to pump blood when "arteries" narrowed.

At the insulation model (Limson M, Krontiris-Litowitz J, Ortiz RM, Pressley TA, Matyas ML. The insulation bag: learning thermoregulation through a "hands-in" activity. *Adv Physiol Ed* 36: 65-67, 2011), participants explored animal adaptations that allow survival in extreme environments. The insulating properties of fat of polar bears, the feathers of geese, and human skin were all compared. Fat was simulated with vegetable shortening, whereas feathers were represented by bubble wrap, and skin served as the control in a bucket of ice water. Each model system was fashioned as a double-gloved system with sealed plastic bags. Children made predictions about the best insulator and then tested each hypothesis. Participants were captivated with the demonstration, which led to discussions on adaptations and the physiological differences of polar bears, birds, and humans.

Members distributed thousands of APS Career Trading Cards and Phizzy Bear Activity Books to teens and children to promote physiology career exploration. ●

Dr. Ibarra handing out trading cards

2016 Frontiers in Physiology Teachers Complete Fellowship

Frontiers in Physiology Research Teacher Fellows completed their fellowship year in April with their attendance at EB2016 in San Diego, CA. Six middle and high school teachers from across the nation began this professional development course in April of 2015 and progressed through the online lessons for 9 months. The Frontiers in Physiology Program was made available by generous support from APS and an NIH Science Partnership Award (SEPA 5R25OD016492-03). The course included readings, sharing of resources, experimental design activities, online poster sessions and discussion boards, lesson development, peer reviews, and development of Bench-to-Bedside Primers. Lead Mentor Instructor Robert Manriquez (Mansfield High School, Mansfield, LA; Research Teacher in 2005) was assisted by Mentor Instructor Tonya Smith (Richland County School District One Schools, Columbia, SC; Research Teacher in 2005) in leading the online forum of modeling inquiry methods for use in the classroom. Overall, teachers from five states took part in this rigorous professional development course, learning not only about physiology but about the best ways to help their students learn science via the scientific method. ●

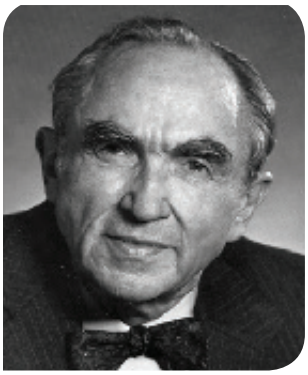
2015-2016 Frontiers in Physiology Fellowship awardees and mentors at EB 2016

The teachers participating in the program included:

Research Teacher	Teacher School	Research Host	Host Institution
Stacey Benson	Pewaukee High School, Pewaukee, WI	John Imig	Medical School of Wisconsin
Judy Birschbach	West Bend East High School, West Bend, WI	John Imig	Medical School of Wisconsin
Catherine Dollard	Northampton High School, Northampton, MA	Jane Kent	University of Massachusetts
Cecelia Dygdon	St. Ann School, Lansing, IL	Sakthivel Sadayappan	Loyola University
Melanie Loulousis	New Berlin High School, New Berlin, IL	Julio Copello	Southern Illinois University School of Medicine
Caitlin Schecker	Bishop McLaughlin Catholic High School, Spring Hill, FL	Jerome Breslin	University of South Florida College of Medicine
Stephanie Schrader	Academy Del Sol, Tucson, AZ	Thomas Pannabecker	University of Arizona

Nominations Sought for New A. Clifford Barger Underrepresented Minority Mentorship Award

APS Launches New Award to Recognize APS Members With Exceptional Mentoring of Underrepresented Minorities


A. Clifford Barger

The American Physiological Society (APS) is pleased to announce the new A. Clifford Barger Underrepresented Minority Mentorship Award. This award recognizes society members who have an outstanding dedication and commitment to excellence in training and education of underrepresented minority (URM) physiologists. Awardees will be evaluated on a variety of categories, including the number of URM trainees they have mentored and the quality of a trainee's mentored research experience, the long-term success of these trainees in their field, demonstrated continued interested in the careers of URM trainees, development and support of institutional programs to support URM trainees, and the mentor's success in scholarship and administration. Award winners will receive a $1,000 award, a commemorative plaque that will be presented at the annual Experimental Biology Business meeting, travel expenses (up to $1,500 to attend) to Experimental Biology, and recognition at the annual Experimental Biology Minority Travel Fellows Luncheon. Awardees will also be invited to write an article relating to mentoring of URM scientists for publication in *The Physiologist* and the APS website, as well as a featured webinar on the topic.

Nominations should be coordinated by a potential awardee's current or former trainee. Each nominator may nominate only one faculty member and may solicit nominations for his/her nominee(s) from no more than three other individuals. Application instructions and more information can be found at the APS website: *http://www.the-aps.org/mm/awards*. Completed applications will be due on September 15, 2016, and an award winner will be selected before the 2017 Experimental Biology Meeting. Please contact the APS Education Office (*education@the-aps.org* or 301-634-7132) with any questions. ●

Bodil M. Schmidt-Nielsen
Distinguished Mentor and Scientist Award

www.the-aps.org/schmidtnielsen

Award: $1,000 + travel expenses for EB 2017 meeting

Deadline: September 15, 2016

The Women in Physiology Committee invites you to nominate an APS member (male or female) who is judged to be both a superb mentor and an outstanding scientist for the 2017 Schmidt-Nielsen Award. Visit the website above for details on the nomination packet requirements and for the online application link.

APS Awards Outstanding High School Students at the Annual Intel International Science and Engineering Fair

Carmen De Miguel, University of Alabama at Birmingham
Anna Stanhewicz, Pennsylvania State University
APS Education Committee

The Intel International Science and Engineering Fair, a program of Society for Science & the Public, is the world's largest pre-college science competition, and it was held at Phoenix, AZ, from May 8-13, 2016. This annual fair includes more than 1,700 high school students who compete as finalists after winning a top prize from one of the 419 Society-affiliated fairs organized in more than 75 countries, regions, and territories. Students showcase their research at the fair as they compete for approximately 400 scholarships and cash prizes totaling around $4 million. The Intel International Science and Engineering Fair encourages millions of students worldwide to explore their passion for innovation and develop solutions for global challenges.

For the 24th 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 a 1-year subscriptions to APS publications. This year's APS judging team included Carmen De Miguel (University of Alabama at Birmingham), Anna Stanhewicz (Pennsylvania State University), Layla Al-Nakkash, Tobias Riede, Chad Carroll, John VandenBrooks (all from Midwestern University), and Rayna Gonzales and Cynthia Standley (from The University of Arizona at Phoenix). The APS judging team evaluated 207 projects based on students' abstracts and selected 18 candidates to interview at their posters.

The following students were selected to receive APS Awards for Excellence in Physiological Research:

- The *first place APS award* ($1,500) was presented to Julienne Chaqour from High Technology High School (Lincroft, NJ) for her translational medical science project titled "The Effect of Plant Hormone Abscidic Acid on the Sprouting of Blood Vessels In Vitro."
- The *second place APS award* ($1,000) was presented to Aarushi Iris Pendharkar from Massachusetts Academy of Math and Science (Worcester, MA) for her biomedical and health sciences project titled "The Effects of Near Infrared Light and Curcumin on Wound Healing and Tissue Regeneration in *Girardia Tigrina*."
- The *third place APS award* ($500) was presented to Asmaa Mahoui from Eman Schools (Fishers, IN) for her animal sciences project titled "Using Pharmacogenetics to Determine the Role of the Orexin System in Panic-Associated Behavior and Physiology."
- The *APS Exceptional Science Award* ($500) was presented to Roman Knudsvig from Berthold High School (Berthold, ND) for his Biochemistry project titled "Caffeine: The Effects on Physical and Mental Alertness." ●

Minority Travel Fellowship Awards
for 2016 Integrative Biology of Exercise Meeting

Application Deadline: July 8, 2016

APS will be offering Minority Travel Fellowship Awards, which provide up to $1,800 in travel expense reimbursement, for the seventh APS Intersociety Meeting, "The Integrative Biology of Exercise," which is held in conjunction with the American College of Sport Medicine (ACSM). The meeting will take place November 2-4, 2016 in Phoenix, Arizona.

For more information about the Minority Travel Fellowship Award program, visit www.the-aps.org/minoritytravel or contact Brooke Bruthers, Senior Program Manager, Diversity Programs, at education@the-aps.org.

To apply, visit www.the-aps.org/awardapps

Chapter News

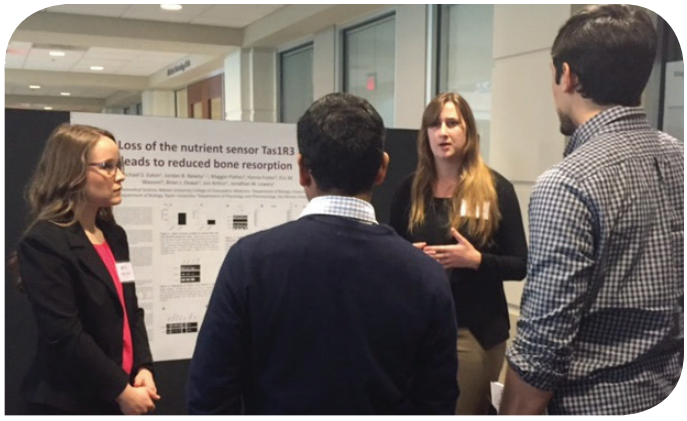
Indiana Physiological Society Sixth Annual Meeting Report

Laura F. Michael
President, Indiana Physiological Society (2016-2017)

The Indiana Physiological Society (INPhys) held its sixth annual meeting on February 27, 2016 at the campus of DePauw University located in Greencastle, Indiana. The 115 attendees comprised of faculty from Indiana colleges, universities, and biomedical companies, as well as trainee scientists from high school, undergraduate, graduate, and postdoctoral programs were welcomed with sunny and warm weather conditions. The theme for the meeting was *Translational Science: Molecules to Organism.*

Following registration and a continental breakfast, the participants were welcomed by Richard Klabunde (INPhys President, 2015-2016) and Pascal Lafontant (Associate Professor of Biology, DePauw University). The scientific sessions began with a keynote address given by Andrew Coggan (Washington University School of Medicine) titled "Popeye: Right for the Wrong Reasons," where he explained why spinach makes muscles stronger *(Figure 1).* The high nitrate content in the leafy greens, not the iron, creates the effect. Patients with heart failure are known to have weaker muscle strength than individuals without heart failure, so Coggan's team explored whether nitrates could increase muscle strength in people suffering heart failure. Two hours after administering beet juice high in nitrate, heart failure patients demonstrated a 13% increase in power in muscles that extend the knee. The researchers observed the most substantial benefit when the muscles moved at the

Andrew Coggan's Keynote Address



Poster sessions in the Percy Julian Science Center


Student lecture in oral session


Alicia Schiller presents "Advocacy for Animal Research"

Table 1. INPhys 2016 Award Winners

Award	Recipient Level/ Category	Amount	Type	Recipient Name	Recipient Institution
1st Place Oral	Any	$500	Travel Award	Gary Long	IUPUI
2nd Place Oral	Any	$300	Travel Award	Andrew Lutkewitte	IUSM
1st Place Poster	PhD/Postdoc	$200	Cash Award	Daniel Sassoon	IUSM
2nd Place Poster	PhD/Postdoc	$100	Cash Award	Alex Kiel	IUSM
1st Place Poster	Undergraduate	$200	Cash Award	Daniel Smith	Ball State University
2nd Place Poster	Undergraduate	$100	Cash Award	Noah Levi and Zach Campbell	Wabash College
1st Place Poster	High School	$100	Cash Award	Asmaa Mahoui	Research conducted at IUSM

highest velocities. The increase in muscle performance was significant in quick, power-based actions. By comparison, muscle strength was not increased in subjects given beet juice with nitrates extracted. The lecture prompted many questions from students and demonstrated simplicity and elegance that are possible in translational sciences.

Four excellent oral presentations were given by students who were selected by a student-led committee based on their submitted abstracts. Topics ranged from differentiation of progenitor endothelial cells, biomarkers of nephropathy, mechanisms driving obesity-induced hepatosteatosis, and live-recording of blood pressures in the exercising rat *(Figure 2)*. Morning sessions were concluded with presentations of the first half of 38 poster presentations *(Figure 3)*. Posters by students were evaluated and scored by a panel of judges for student awards.

Following a catered hot lunch in the Union Building Ballroom, the second half of poster presentations resumed. Following the poster session, attendees were invited to participate in one of three, hour-long breakout sessions: *Careers in Physiology Panel Discussion* featuring Susan Gunst, Mark Kowala, and Amy Haug; *Model Organisms in Physiology Research and Teaching Featuring Skin Grafting in Xenopus Laevis* led by Kevin Kinney and his students; *Non-mammalian Model of Heart Regeneration* led by Lafontant's laboratory; or *Educating the Educator* featuring Keely Cassidy. A second oral session for four student presentations included topics such as vasculogenic properties of endothelial colony-forming cells exposed to intrauterine diabetes, characterization of a new diabetes mouse model named FATZO, zebrafish as a model of corneal repair, and the role of taste receptor Tas1R3 in bone resorption. The final seminar for INPhys 2016 was *Animal Research Advocacy* presented by Alicia Schiller (American Physiological Society Science Policy Committee Representative) *(Figure 4)*. Schiller explained why simplifying messages about research is critical to garner support. Engaging a potential audience (family, friends, legislators) with understandable information is foundational to ultimately reaching agreement or disagreement on a complex topic. Following Schiller's presentation, awards and election results were announced (Table 1). Two travel awards were awarded to the top oral presentations, and poster awards were given to two undergraduate students and two postgraduate students. One high school student earned a poster award. Two new councilors were voted into office during the meeting: Mikaela Drake (Butler University)

Scientists from across Indiana attend INPhys 2016

and Mark Kowala (Eli Lilly and Company); two student councilors were elected: Cassandra Gohn and Kaela Varberg, both of the Indiana University School of Medicine; and Pascal Lafontant was chosen as president-elect for the 2016-2017 term.

The INPhys leadership is inspired by the large number of students who were able to participate in the meeting from as far as Evansville, Indiana to Upland, Indiana *(Figure 5)*. The quality of oral and poster presentations paralleled the national level, illustrating that scientists in Indiana have bright futures in global research programs. We are grateful for the scientifically rich, yet entertaining Keynote presentation that taught students that hypothesis testing may lead to an unanticipated answer and that science is fun. We are grateful that the American Physiological Society funded the travel expenses for Schiller to attend INPhys 2016 and encourage each of us to share our passion for research with family, friends, and community members who might be able to champion science for improving quality of life. Finally, we appreciate the following sponsors that financially supported the meeting, keynote speakers, and awards: DePauw University Office of Academic Affairs, Science Research Fellows honors program, and Department of Biology, IU School of Medicine-Muncie, University of Southern Indiana, Data Sciences International, Kent Scientific, the American Physiological Society, and Eli Lilly and Company. ●

People and Places

Patricia Halpin Received Presidents' Good Steward Award

Patricia Halpin

APS member Patricia Halpin has been awarded the 2016 Campus Compact for New Hampshire-Presidents' Good Steward Award. This award was given in recognition of her outreach efforts in sharing her expertise and passion for science with the community. Some of these efforts include the implementation of the American Physiological Society's PhUn (Physiology Understanding) Week Outreach Program, annually leading elementary school students in the design and implementation of an exercise physiology experiment, and conducting PhUn outreach activities with the Manchester middle and high school students who participate in the UNH Manchester EXCELL in STEM Program. ●

Houser Named President-Elect of American Heart Association

Steven R. Houser

APS member Steven R. Houser (Senior Associate Dean of Research, Vera J. Goodfriend Endowed Chair of Cardiovascular Research and Director of the Cardiovascular Research Center at the Lewis Katz School of Medicine at Temple University) has been elected to serve as president-elect of the American Heart Association (AHA). Houser has been an APS member since 1978. Houser is an internationally respected cardiovascular researcher who has helped define many fundamental features of normal cardiac myocyte and identify molecular and cellular processes that produce abnormal cardiac myocyte function in cardiovascular disease. Under a current NIH grant, his research group is now working to develop new approaches to prevent, slow, or reverse damage to the heart after a heart attack. His 1-year term as president-elect runs through June 30, 2016. He will then serve a 1-year term as AHA president beginning July 1, 2016. ●

Kuebler Recognized by the German Cardiac Society

From *left* to *right:* Andreas Zeiher (Frankfurt; Congress President), Wolfgang M. Kuebler, Juergen Schrader (Duesseldorf; Chair Arthur Weber Award Committee), Karl-Heinz Kuck (Hamburg, President of the Society)

At the 82nd Annual Conference of the German Cardiac Society, the Arthur Weber Preis for "Helping by Research" was awarded to APS member Wolfgang M. Kuebler. The German Cardiac Society recognized Kuebler for his "outstanding contributions on the PHYSIOLOGY of the pulmonary circulation and the pathophysiology of pulmonary hypertension.". ●

Feldman to Deliver Hodgkin-Huxley-Katz Prize Lecture

APS Member Jack Feldman, Distinguished Professor of Neurobiology at the David Geffen School of Medicine at UCLA, has been chosen to deliver the Hodgkin-Huxley-Katz Prize Lecture for 2017 in recognition of his outstanding achievements in the physiological sciences. The award is presented biennially by The Physiological Society (UK) to a physiologist working outside the United Kingdom. Feldman will present his lecture to the International Union of Physiological Sciences in Brazil in August 2017.

Katzenellenbogens Awarded Fred Conrad Koch Lifetime Achievement Award

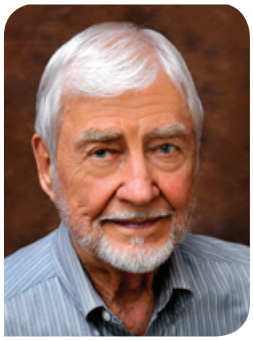
APS Member Benita S. Katzenellenbogen and her husband John have been awarded the Fred Conrad Koch Lifetime Achievement Award by the Endocrine Society. The award is the Endocrine Society's highest honor recognizing lifetime achievements and exceptional contributions to the field of endocrinology. Benita Katzenellenbogen is currently the Swanlund Chaired Professor of Molecular and Integrative Physiology, and John Katzenellenbogen is the Swanlund Chaired Professor of Chemistry at the University of Illinois, Urbana. Their selection for the award is the first time the award has honored two scientists who collaborate both at work and at home as a married couple. Their enormous contributions to the field of endocrinology – spanning more than four decades – have greatly advanced our understanding of the broad actions of steroid hormones and their receptors in diverse target tissues in health and disease. Their pioneering work on estrogens and estrogen receptors has defined the multifaceted modes by which these receptors are regulated and act in distinctive and biomedically significant ways. These seminal contributions have also highlighted novel approaches for the diagnosis and treatment of hormone-responsive cancers and beneficial modes of tissue-selective estrogen action for managing various disorders, including endometriosis and multiple sclerosis.

Chien Receives Benjamin Franklin Medal in Mechanical Engineering

APS Member Shu Chien (University of California, San Diego) was the recipient of the Benjamin Franklin Medal in Mechanical Engineering for his contributions to the understanding of the physics of blood flow and for applying this knowledge to better diagnose cardiovascular disease. The award was presented to Chien during The Franklin Institute's Award Ceremony and Dinner on April 21 in Philadelphia.

News From Distinguished Physiologists

Images from the Past



Kenneth Goetz

Kenneth Goetz

While rummaging through a neglected file cabinet some days ago, I came across a stack of photographs, each showing segments of polygraph records from old experiments. I turned over the top photo and checked the date written on the back: February 19, 1973, some 3 years after I had set up my laboratory at St. Luke's Hospital of Kansas City. The date, seemingly so long ago, prompted me to do a little calculation, which revealed a surprising fact. I now have been retired for longer than I worked as a full-time physiologist. Well, I can assure you that even an aging brain snaps to attention with a discovery of that magnitude. With my declining population of neurons firing at an unaccustomed rate, I took the photos to my desk to sort through, feeling again the excitement those experiments had ignited, the astonishment they had created, even experiencing an echo of the buzz I once had felt. But, shortly after I sat down, my euphoria was punctured by a disheartening truth. The remarkable data from those experiments, the remnants of which I held in my hand, were never properly published.

Why the flub? Time has blurred a definitive answer, but the story of my stumble may alert others to avoid a similar blunder. The experiments I refer to were relatively straightforward. We denervated the aortic baroreceptors and chemoreceptors in a group of dogs by the method of Edis and Shepherd (2), leaving the vagi intact, and then denervated the carotid baroreceptors and chemoreceptors by severing the carotid sinus nerve, delicately stripping adventitia from the carotid sinus, and painting the area with phenol. Catheters were inserted for hemodynamic recording, and the animals were allowed to recover to full health.

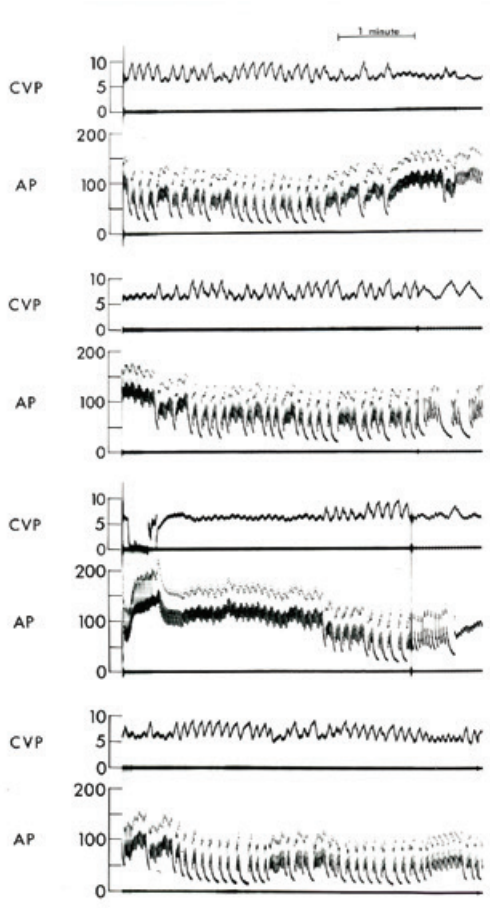
Weeks after the operation, when we began our recordings, the results created an instant stir. Although the dogs lay peacefully on a padded table, their hemodynamics were in a frenzy. Blood pressure swung widely and unpredictably. Heart rate was equally labile, accelerating as pressure rose and slowing as pressure fell. Changes of >100 mmHg within minutes were routine, and it was not uncommon to observe changes of even greater magnitude appearing within seconds.

Most impressive were the striking periods of hypotension and bradycardia we observed, a phenomenon illustrated on the second photo I examined. Using a ruler and the time marker on the photo, I counted the beats occurring during a selected 1-minute period. Eight! I recalled my amazement as that experiment unwound, the animal lying quietly, showing no evidence of distress while its heart gathered itself to beat once every 7 or 8 seconds. Yet moments before (as I saw in the panel directly above), the animal had been hypertensive, with a systolic pressure of over 200 mmHg and a concomitant tachycardia. I looked at another photo from a different animal, this one depicting an even longer period of asystole:12 seconds without a heart beat, an interval during which the diastolic pressure fell to 17 mmHg. Not only did these unexpected and dramatic periods of hypotension rebut the then prevailing view that elimination of the sinoaortic baroreceptor reflex causes a sustained hypertension, they also strongly reinforced the opinion that the vital and primary importance of this reflex is to buffer the huge and unpredictable fluctuations that occur when it is absent, at least in the conscious state.

Our observations during these experiments hinted that the animals' hemodynamic gyrations were mediated, at least partially, by their emotional state. While they were adapting themselves to the padded table, their blood pressures tended to be higher than after they became comfortable in their surroundings. Moreover, blood pressure tended to correlate with their levels of arousal. This was illustrated in the first photo I looked at, one in which blood pressure varied over the course of a few minutes from lows of roughly 95/45 to highs of 200/145. When the pressure

was about 140/80, the investigator had tapped on the table (marked on the record) and caused an abrupt increase in blood pressure to a peak of 225/150 within 15 seconds. After the dog's pressure came back down, the investigator petted its head, a stimulus that produced another abrupt rise in pressure, although the response was less pronounced than that produced by tapping on the table. Minutes later, an investigator outside the laboratory knocked loudly on the closed lab door. The dog lifted his head at this stimulus and also lifted his blood pressure impressively, systolic pressure peaking at 312 mmHg.

To confirm what seemed obvious, namely that these huge fluctuations were produced by the autonomic nervous system, we blocked activity of the vagi with atropine, which increased heart rate and minimized its fluctuations. We then induced sympathetic blockade with propranolol and phentolamine, and, as anticipated, blood pressure and heart rate became perfectly stable.



One rediscovered polygraph record

Even a loud knocking on the outside of the laboratory elicited no hemodynamic response after blockade.

This was the state of our data collection from a sizeable number of dogs in May 1973, the month when Cowley and his colleagues (1) presented data indicating that persistent hypertension is not produced in dogs when effects from arterial baroreceptors are absent, a conclusion fully compatible with our own. Their report was not a complete surprise. I had known of their investigation in progress, but somehow the publication threw me off course. In retrospect, I don't know why I didn't call or write Cowley (no e-mail then) to congratulate him and his team, and tell him how our work dovetailed nicely with theirs, and to discuss how our dissimilar preparations had highlighted different hemodynamic effects of baroreceptor denervation. The Mississippi group had recorded data continuously over 24-hour periods and used computer analysis to determine mean arterial pressure and other variables over extended periods of time, something we did not. On the other hand, the vagal pathways in our animals were intact, whereas Cowley and colleagues had not only stripped the aortic arch of their animals, but they also severed the left cervicovagal trunk and the medial bundle of the right vagus. This substantial removal of vagal influences likely explained why they failed to observe the profound bradycardia and long periods of cardiac standstill (and associated dramatic falls in diastolic pressure) that were evident in our experiments. In short, the two sets of experiments were compatible, and when combined produced more information than either one alone. All of this came back to me as I examined the old photos.

Why did I throw in the towel and fail to follow through? That I cannot reconstruct. Memory fails me, but I suspect a combination of factors led me astray, some embarrassing even now to admit. I probably was green enough to think that the cat was out of the bag, that careful investigators had demonstrated that sinoaortic denervation does not cause hypertension and that was that. Admittedly, I was an accidental physiologist, one vastly undertrained. As a first-year medical student, I had rebelled against what I saw as little more than mindless memorization, committing acts of immature idiocy for which I probably should have been expelled. After those two distressing semesters, I split my second year of medical school

courses with a graduate assistantship in physiology (being strapped for cash, and tempted by the stipend offered by the department). After finishing that phase, I opted to complete my PhD, which I somehow did, unbelievable as it now sounds, without taking a single graduate course, without attending a single scientific meeting, without reading current journals, and by doing a little project and writing a thesis without a mentor. To compound my innocence, I took no postdoctoral position (it wasn't recommended to me), but I landed a junior faculty position at the University of Kansas Medical Center, where I began learning and teaching physiology while applying for and receiving a modest NIH grant (sorry youngsters, things were easier then). About this time, it occurred to me that it would be foolish not to complete the clinical years of medical school, so I switched to half-time faculty status, kept my NIH grant active, and completed my clinical rotations, earning my MD in 1967. After returning to the physiology department full time, I realized that an MD is merely decorative without a medical license, so I zigged through another zag and accepted a medical internship at St. Luke's Hospital of Kansas City, one with the interesting enticement that I would be paid twice the normal intern's stipend for providing biweekly pathophysiology lectures for the hospital's attending staff and house staff while completing my internship. (While interviewing for the internship, I had given an impromptu lecture on myocardial force-velocity relationships to a group of residents struggling with the concept.) Upon completing my internship, I had planned to return to the physiology department at the University of Kansas Medical Center, but when the time came I was faced with two other options: to continue my medical training by taking a residency or to stay on at St. Luke's where the hospital promised to equip a new laboratory for me if I would continue my lectures. I opted for the latter, thus establishing and becoming head of a unit I chose to call the division of experimental medicine in January 1970, a rather high-sounding title for a unit consisting of one member, me. The experiments described above were conducted after I had added two technicians and a postdoctoral fellow.

There probably were other reasons for my negligence. We were doing other experiments at the time, some on cardiac receptors, a major interest of mine then. I had begun searching exhaustively through the sizeable literature for anything even remotely related to what then was known as the Gauer-Henry reflex with the intention of writing a review, one that subsequently was published in 1975 in *Physiological Reviews*. Beyond that, I was pleasantly engaged in teaching, being perhaps overzealous in my preparation of a steady stream of fresh lectures on pathophysiology for the hospital's attending staff and house staff, and teaching cardiovascular and pulmonary physiology in courses for cardiac-care nurses. All of this, of course, is merely background noise that probably distorts what was actually going on in my head at the time. Whatever the factors involved, a simple moral emerges. If you have good data, publish it!

A small portion of the data described above did appear in print. Because we had recorded central venous pressure in our experiments, and because our animals had intact vagi, our findings argued against the concept of what has been called the Bainbridge reflex. Some may recall that Bainbridge, over a century ago, infused blood or saline into anesthetized dogs and observed a resultant tachycardia, a response that no longer occurred after he severed the vagus nerves bilaterally. He attributed the infusion-induced tachycardia to a reflex from receptors in the right heart or great veins. This interpretation, of course, was a bit of a stretch. After vagotomy, Bainbridge's dogs naturally had a higher baseline heart rate before they received the infusions, leaving less opportunity for acceleration, and it goes without saying that infusions influence the entire circulatory system, not merely the right heart and great veins.

Contrast the above to our experiments in which central venous and right heart filling pressures increased as anticipated during bradycardia, the pressures rising higher as the periods of diastole lengthened. Yet these increases in central venous pressure elicited no evidence of any cardiac accelerator reflex to counter the prevailing bradycardia in these conscious animals with intact afferent and efferent nerves to the heart. This finding, contradictory to Bainbridge's concept, was particularly persuasive during those periods of severe bradycardia that lasted over a minute, a time far longer than it would take for a reflex to kick in and accelerate the heart. These observations led us to conclude that the Bainbridge reflex is likely an illusion engendered by over-interpretation of nonspecific experiments. I presented this portion of our data at a symposium

on cardiac receptors in Leeds in 1976, and two of the photos I recently discovered appeared in the report of that symposium (3).

Having experienced an extended and gratifying period of unemployment, perhaps I'm qualified to conclude with a few words about retirement. I recommend keeping it cluttered. Waves of pursuits and new exploits continue to make life interesting, even when the professorship is emeritus and the laboratory is closed. To this day, I jot down a daily to-do list on a 3 x 5 card. (Yes, I have an iPhone, an iPad, and a PC, but some habits die slowly.) Appearing on my cards are activities with friends and family, plays, concerts, physical exercise, hobbies, reading, travel, everything you might expect, as well as completing this essay for several days in a row. (I seldom cross off every item on my list by day's end.) I keep another list for projects requiring more sustained effort. These I consider to be of prime importance because, like research projects, they set long-term goals. Here are two completed examples of my own. When I learned that my two youngest siblings have no memory of our mother, who died at 37, and only vague memories of our father who passed on a few years later, I wrote, over many months, an account of our childhood for them. By chance, about this time I met Frank McCourt, whose *Angela's Ashes* was topping best-seller lists. Detecting a number of similarities between McCourt's story and my own, I thought mine might draw a wider audience, so I cut the manuscript by half, eliminating what I thought would interest only friends and relatives, and saw the story emerge between covers as *Bending the Twig*. While never a best-seller, the book sold a few thousand copies, and sales continue to dribble along even now, some 14 years after its publication. More recently, I logged countless hours writing fiction. During my less-than-exemplary first year of medical school, I often thought the experience would be worthy of a novel (in truth, I read a good number of novels during that dismal year). So I took on the task of writing one that came out in 2015, titled *The Colors of Medicine*. I sent my novel's protagonist (not me, but a young man with a better brain and a more practical form of rebellion) to the medical school I attended. Perhaps not surprisingly, I then launched him into a research career, and, because fraud often makes headlines, I inserted into the plot a case of fraudulent research (simplified for the lay reader). I even included a rather extended conversation concerning baroreceptor reflexes and the autonomic nervous system, putting it in a context most suitable for an adult physiology course. Writing that scene, and others that were set in laboratories and scientific meetings, often evoked a lingering nostalgia that in turn summoned recollections of my days as a physiologist. And then, when I would think back and focus on the many friends and former colleagues I unavoidably have lost contact with, when I thought of those I would never see again, I would come face to face with the most palpable drawback of retirement. ●

References

1. Cowley AW Jr, Liard J F, Guyton AC. Role of the baroreceptor reflex in daily control of arterial blood pressure and other variables in dogs. *Circ Res* 32: 564-576, 1973.

2. Edis AJ, Shepherd JT. Selective denervation of aortic arch baroreceptors and chemoreceptors in dogs. *J Appl Physiol* 30: 294-296, 1971.

3. Hainsworth R, Kidd C, Linden RJ (editors). *Cardiac Receptors*. Cambridge, UK: Cambridge Univ. Press, 1979, p. 228-229.

Letter to Peter K. Lauf

Carolyn D. Berdanier writes: "What a pleasure to receive your birthday greetings! Yes, the big 80 is looming, and for the life of me I do not know where the years have gone! However, I must admit that aging is not for the faint of heart. Yet, the alternative is not a picnic either.

"It is said that it takes a village to raise a child . . . I think that is also true for scientists. It takes a whole network of colleagues to mold a scientist. Remembering all those terrific people is indeed a trip down memory lane. My mentors were so giving and supportive; my colleagues, new and old, helped me grow intellectually. Will Gortner, Edith Weir, Shelly Reiser, Richard Tobin, Royal McGraw, James Hargrove, Ed Leiter, and all those scientists who reviewed my manuscripts and my grant applications were incredibly helpful. Lastly, working with such talented undergraduate and graduate students made every day a challenge and a delight.

"Now that I am no longer in the lab, my best friend is my computer. It provides daily updates from the world of science, disclosing the latest discoveries and breakthroughs. The joy of discovery has never left my soul. I love to write, and in the writing I make new discoveries for myself. Mostly what I write these days are combinations of history and human adventure and travails. Lately, I have written about the development of the Native American plant foods, the use of pictures in logos that sell food, and the use of new DNA techniques to screen for genetic-based diseases, and I am going to look into the life and times of Lavoisier. All fun topics!

"Eighty years of living has meant 80 years of experiences – too many to list. It has been a life that has given me joy and sorrow. My husband of 59 years, three children who are productive adults, four grandchildren, and one great-grandchild constantly keep me going. Thanks to everyone!" ●

Publications

Current Calls for Papers

Physiological Genomics

- Gut Microbiota in Health and Disease
- Systems Biology and Polygenic Traits
- Single Cell Analysis *(Submission deadline: May 31, 2017)*

Journal of Neurophysiology

- Spinal Control of Motor Outputs *(Submission deadline: December 31, 2016)*
- Building Neural Circuits: Wiring and Experience *(Submission deadline: December 31, 2016)*
- Biology of Neuroengineering Interfaces *(Submission deadline: December 31, 2016)*

Advances in Physiology Education

- Historical Perspectives and Living Histories
- American Journal of Physiology – Gastrointestinal and Liver Physiology
- Microbiome and Host Interactions
- Nutrient Sensing, Nutrition, and Metabolism
- Systems Biology
- Translational Human Pathophysiology

American Journal of Physiology – Heart and Circulatory Physiology

- Advances in Cardiovascular Geroscience *(Submission deadline: November 30, 2016)*
- The Cardiorenal Syndrome-Integrative and Cellular Mechanisms *(Submission deadline: September 15, 2016)*
- Metabolism, Cell Signaling and Disease *(Submission deadline: September 15, 2016)*
- Cardiovascular Actions of Hydrogen Sulfide and Other Gasotransmitters *(Submission deadline: August 31, 2016)*

American Journal of Physiology – Lung Cellular and Molecular Physiology

- Electronic Cigarettes: Not All Good News? *(Submission deadline: October 1, 2017)*
- Ion Channels and Transporters in Lung Function and Disease
- Age-Related Dysfunction in Lung Barrier Function in Health and Disease
- Real-Time Visualization of Lung Function: from Micro to Macro *(Submission deadline: January 2017)*
- Biomarkers in Lung Diseases: from Pathogenesis to Prediction to New Therapies *(Submission deadline: January 2017)*
- Sex Differences in the Respiratory System
- Translational Research in Acute Lung Injury and Pulmonary Fibrosis *(Submission deadline: January 2017)*

American Journal of Physiology – Regulatory, Integrative and Comparative Physiology

- Hypertensive Disorders of Pregnancy: Effects on Mother and Baby *(Submission deadline: December 1, 2016)*

For a complete list of current Calls for Papers, visit the APS website.

Books Received

Animal Physiology (4th Edition)
By Richard Hill, Gordon Wyse, and Margaret Anderson
Sunderland, MA: Sinauer Associates, Inc., 2016, 828 p., 675 illus., $159.95 (hardback)
ISBN: 9781605354712

Membership

New Regular Members

***transferred from student membership**

Mir Mohammad Kamran Abbas
Texas A&M Univ., Houston, TX

Robin Altman
Beloit College, Beloit, WI

Cristina Maria Alvira
Stanford Univ. Sch. of Med., Palo Alto, CA

Zsolt Bagi
Augusta Univ., Martinez, GA

Amy Michele Bataille
Eastern Connecticut State Univ., Marlborough, CT

Clive M. Baumgarten
Virginia Commonwealth Univ., Richmond, VA

Mirza Irfan Beig
UNTHSC, Fort Worth, TX

Ivor J. Benjamin
Med. College of Wisconsin, Milwaukee, WI

Carol A. Bertrand
Univ. of Pittsburgh Sch. of Med., Pittsburgh, PA

Jean-Sébastien Blouin
Univ. of BC, Vancouver, BC, Canada

Robert Brenner
Univ. of Texas Hlth. Sci. Ctr., San Antonio, TX

Sylvain Brunet
Case Western Reserve Univ./ Cleveland Clinic, Cleveland, OH

Charles Francis Burant
Univ. Michigan, Ann Arbor, MI

Melissa Cameron
The Univ. of Sydney, Sydney, Australia

Carmen Canavier
LSU Hlth. Sci. Ctr., New Orleans, LA

Jennifer Mehlman Carbrey
Duke Univ. Sch. of Med., Durham, NC

Aaron Cecala
Elizabethtown College, Elizabethtown, PA

Andy J. Chang
Stanford Univ. Sch. of Med., Stanford, CA

Arthur J. Cheng
Karolinska Inst., Stockholm, Sweden

Streamson Chua
Albert Einstein College of Med., Bronx, NY

Paola Contessa
Delsys, Inc., Natick, MA

James Edward Cooke
UCSD, La Jolla, CA

Cassy Cozine
Coe College, Cedar Rapids, IA

Prasad Shridhar Dalvi
Univ. of Bradford, Bradford, United Kingdom

Anna K. Davis
Bastyr Univ., Seattle, WA

Lynn Diener
Mount Mary Univ., Milwaukee, WI

Michelle Digman
Univ. of California Irvine, Irvine, CA

David Duriancik
Univ. of Michigan-Flint, Flint, MI

John Robert Economides
Univ. California-San Francisco, San Francisco, CA

Laura Edgington-Mitchell
Monash Inst. of Pharmaceutical Sci., Parkville, Australia

Samer Wassim El-Kadi
Virginia Tech, Blacksburg, VA

Dario Farina
Univ. Med. Ctr. Goettingen, Göttingen, Germany

Jorge P. Figueroa
Wake Forest Sch. of Med., Winston-Salem, NC

Len Forgan
Deakin Univ., Grovedale, Australia

Susan K. Fried
Boston Univ. Sch. Med., Boston, MA

William Nelson Frost
Rosalind Franklin Univ., North Chicago, IL

Teppei Fujikawa
UT Southwestern Med. Ctr., Dallas, TX

Scott Fuller
PBRC, Baton Rouge, LA

Pietro Renato Galassetti
Univ. California, Irvine Orange, CA

Christopher Gayer
Children's Hosp. Los Angeles, Los Angeles, CA

Asif Ghazanfar
Princeton Univ., Princeton, NJ

Jeff Grim
The Univ. of Tampa, Tampa, FL

John M. Redden
Univ. of Connecticut, Storrs, CT

Robert Renden
Univ. of Nevada Sch. of Med., Reno, NV

Charles L. Rice
The Univ. of Western Ontario, London, Canada

Nicolette Richardson
York Univ., Guelph, Canada

Wito Richter
Univ. of South Alabama, Mobile, AL

Melissa Riddle-Kottke
Army Inst. of Surgical Res., Converse, TX

Stephen Walter Rothwell
Uniformed Services Univ., Bethesda, MD

Sharon M. Rymut
Case Western Reserve Univ., Broadview Heights, OH

Suha M. Saleh
Univ. of Central Florida, Orlando, FL

Tracy Schatteman
Univ. of Illinois-Springfield, Springfield, IL

Mark A. Segraves
Northwestern Univ., Evanston, IL

Dae Yun Seo
Cardiovascular and Metabolic Disease Ctr., Busan, Republick of Korea

Kristin Simokat
Ashland Univ., Ashland, OH

Melvin F. Simoyi
Heritage Univ., Toppenish, WA

Mayank Soni
Mustandmore Hlth., Delhi, India

Patrick Sonner
Wright State Univ., Dayton, OH

Heather Logan Sprenger
Canadian Sport Inst. Ontario, Toronto, Canada

Yuriko Sugiuchi
Tokyo Med. and Dental Univ., Tokyo, Japan

Merryn Tawhai
Univ. of Auckland, Auckland, New Zealand

Irina Alexandrovna Tikhomirova
Yaroslavl State Pedagogical Univ., Yaroslavl, Russian Federation

Theodore Francis Towse
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Theo A. Van Kempen
North Carolina State Univ., Venray, Netherlands

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Univ. of Wisconsin-Madison, Madison, WI

David Q. Wang
Saint Louis Univ. Sch. of Med., St. Louis, MO

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Univ. of Pikeville, Pikeville, KY

Paul J. Wolters
UCSF, San Francisco, CA

Christiane Wrann
Massachusetts General Hosp., Charlestown, MA

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Victoria Univ., Melbourne, Australia

Yaoda Xu
Harvard, Cambridge, MA

Eric Yen
Univ. of Wisconsin-Madison, Madison, WI

Liya Yin
Northeast Ohio Med. Univ., Rootstown, OH

Sotirios G. Zarogiannis
Univ. of Thessaly Med. Sch., Larissa, Greece

Teresa A. Zimmers
Indiana Univ., Indianapolis, IN

New Graduate Student Members

Johnathon Michael Aho
Mayo Clinic, Rochester, MN

Israa Al-Ibadi
Univ. of Salford, Manchester, United Kingdom

Awad Almuklass
Univ. of Colorado Boulder, Boulder, CO

Scott Amiss
California State Univ. Northridge, Los Angeles, CA

David Cristóbal Andrade
Pontificia Univ. Católica de Chile, Santiago, Chile

Sara Augustinas
Georgia State Univ., Atlanta, GA

Nicole Christine Aurigemma
Pennsylvania State Univ., State College, PA

Vivian Biancardi
UNESP, Jaboticabal, Brazil

Natalie Bickett
Scripps Inst. of Oceanography, La Jolla, CA

Mehmet Bulbul
Akdeniz Univ. Faculty of Med., Antalya, Turkey

Timothy Burnett
Ball State Univ., Muncie, IN

David Bushart
Univ. of Michigan, Ann Arbor, MI

Robert Christner
Univ. of New Mexico, Albuquerque, NM

Michael Cooper
Univ. Of Kansas Med. Ctr., Merriam, KS

Clifford Costello
NYIT College of Osteopathic Med., Brooklyn, NY

Emily C. Dabe
Univ. of Florida, St. Augustine, FL

Blair Denman
Univ. of Colorado Boulder, Boulder, CO

Eryn Dixon
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Adam Voss
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Bangchen Wang
Univ. of Nebraska Med. Ctr., Omaha, NE

Undergraduate Student Members

Amber Beard
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Sarah Elizabeth Brown
Lee Univ., Dayton, TN

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Brittany Eisinger
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Lee Univ., Marietta, GA

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David Littlefield
Littlefield Optometry, Kansas City, MO

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Justyna Michalik
VBRI, East Orange, NJ

Eunjung Shin
Georgia Inst. of Tech., Johns Creek, GA

Brian Sugai
Big Island Footcare, Inc., Hilo, HI

Yi-Ting Yeh
UCSD, La Jolla, CA

Positions Available

Postdoctoral Fellowship: The Damage Control Resuscitation Task Area at the U.S. Army Institute of Surgical Research (USAISR) is seeking a candidate for a postdoctoral position. The objective of our research program is to improve methods to control severe bleeding and to provide sufficient fluids and blood products to stabilize the injured casualty. The specific research focus area for this position is to explore resuscitation strategies for the burned patient in a pre-hospital setting due to prolonged field care and/or mass casualty situations. Research projects will utilize animal models of burn and/or hemorrhage to study: *1)* the effects of gastroenteral and intravenous resuscitation fluids; *2)* the relationship of systemic and local inflammation (e.g., cytokines, leukocytes); *3)* the role of oxidative stress in renal perfusion and dysfunction. Qualified candidates must be highly motivated, independent individuals with a PhD in physiology, immunology, cell biology, biochemistry, or a related field. Candidates must have exceptional laboratory and written communication skills, and the ability to work both independently and cooperatively within a team. Candidates should also be U.S. Citizens or have resided in the U.S. for a minimum of 3 years. Experience with large animal models and/or assessments of kidney function preferred. Experience with primary tissue culture, histology, and/or molecular and biological techniques are essential. Individuals with experience in large animal instrumentation, flow cytometry, and knowledge of immunology or upper urinary tract physiology are highly encouraged to apply. The stipend/salary is $50,000 and up, depending on prior experience. Candidates will be joining a research program that focuses on understanding potential mechanisms involved in battlefield burn injuries and developing new treatment modalities to improve patient outcome. Emphasis is placed on transitioning products from pre-clinical to clinical testing in a collaborative environment involving researchers and clinicians. The USAISR is colocated with San Antonio Military Medical Center (SAMMC) in San Antonio, TX, which enables the research organization to have a unique, in-depth understanding of combat injuries and civilian trauma, and the clinical challenges faced by the physicians and surgeons who treat them. This creates a unique environment for translational research.

Postdoctoral Fellowship: A postdoctoral research position is available in the laboratory of Dr. Lawrence Sinoway at Penn State Hershey Heart and Vascular Institute (PSHVI), Penn State College of Medicine, in the area of autonomic and cardiovascular physiology. The laboratory is focused on understanding the role of the sympathetic nervous system in the control of cardiovascular function during exercise in health and in cardiovascular disease. Specifically, the major goal of our laboratory is to examine how the rise in blood pressure with exercise affects blood flow and oxygen delivery to important organs in the body. These studies utilize the techniques of Doppler ultrasound, MRI, microneurography, and pharmacological interventions. The ideal candidate will have a MD or PhD at the time of appointment. A strong background in autonomic, cardiovascular, muscle reflex, or exercise physiology is required. Prior experience performing hemodynamic studies is highly desired. The successful applicant will be expected to participate in all aspects of the research project, including experimental design, data collection, data analysis, preparation of graphs and figures, and preparation of manuscripts. Strong writing and oral communication skills are highly desired. Leadership ability and interpersonal skills are vital to this position. Ample opportunity exists for collaboration with other investigators in the PSHVI engaging in pre-clinical and clinical cardiovascular research. Highly motivated candidates should submit *1)* a cover letter summarizing research interests and career goals, *2)* a current curriculum vitae, and *3)* the names of at least 3 references to *https://psu.jobs*, job posting number 63000. Penn State is an equal-opportunity, affirmative-action employer, and is committed to providing employment opportunities to all qualified applicants without regard to race, color, religion, age, sex, sexual orientation, gender identity, national origin, disability, or protected veteran status.

Postdoctoral Fellowship: The Penn State Hershey Heart and Vascular Institute has an open postdoctoral research position in the laboratory of Marc P. Kaufman. The laboratory investigates the control of the cardiovascular system during exercise in both health and in simulated peripheral artery disease. The position offers a highly competitive salary, benefits, and an outstanding research environment. Applicants should have an interest in cardiovascular physiology, electrophysiology, or integrative aspects of exercise physiology. Studies include investigations into the metabolic and mechanical signals that evoke the

exercise pressor reflex in both health and simulated peripheral artery disease. Collaboration and interaction will be encouraged with other investigators in the institute. In vivo rat models are used to perform integrative and electrophysiological studies using both pharmacological blockades and siRNA. The ideal candidate will have a PhD or MD at the time of appointment. A background in autonomic, cardiovascular, genetic engineering, and/or exercise physiology would be useful. The successful applicant will be expected to participate in all aspects of the research project, including experimental design, data collection, data analysis, preparation of graphs and figures, and preparation of manuscripts. Strong writing and oral communication skills are highly desired. Interested candidates should submit to *https://psu.jobs* (job posting no. 63307): *1)* a brief cover letter summarizing research interests and career goals, *2)* a current curriculum vitae, and *3)* the names of at least 2 references. Penn State is an equal-opportunity, affirmative-action employer, and is committed to providing employment opportunities to all qualified applicants without regard to race, color, religion, age, sex, sexual orientation, gender identity, national origin, disability, or protected veteran status.

Postdoctoral Fellowship: A postdoctoral position is available at the Joslin Diabetes Center/Harvard Medical School in the area of translational exercise physiology and muscle biology. The candidate will work in the Department of Clinical Research as a member of Joslin's new Translational Exercise Physiology Laboratory. The focus of the laboratory is to determine how exercise-stimulated cellular signaling and adaptations in skeletal muscle contribute to the prevention and treatment of chronic metabolic disease. We employ an integrative multi-disciplinary approach, examining physiological responses to exercise in both humans and animal models. The ultimate goal of this work is to develop therapeutic protocols that will maximize the health benefits of exercise in populations at increased risk for metabolic disease. The Joslin Diabetes Center is the world's largest diabetes research center and has a top-tier postdoctoral research training program. The successful candidate will have access to the multitude of resources available at Joslin, Harvard Medical School, and Boston's Longwood Medical Area. *Requirements: 1)* PhD in biomedical science, exercise science, or molecular biology; *2)* experience in physiological research involving animal models and/or human subjects; *3)* training and experience in exercise physiology; *4)* strong record of productivity and publication; *5)* excellent communication skills. Interested applicants should e-mail a cover letter, curriculum vitae, and the contact details of 2 references to Dr. Sarah Lessard at *sarah.lessard@joslin.harvard.edu*.

Postdoctoral Fellowship: A postdoctoral researcher position in physiological genomics is available within the Department of Pharmacology & Experimental Therapeutics at Louisiana State University Health Sciences Center, New Orleans, LA. The position is available to investigate the molecular and physiological roles of angiotensin converting enzyme type 2 (ACE2) in the regulation of cardiovascular function in vivo and in vitro. Our laboratory (*http://www.medschool.lsuhsc.edu/pharmacology/lab_lazartigues_index.aspx*) takes a multidisciplinary approach to investigate autonomic nervous function and to determine the cellular and molecular mechanisms of ACE2 in normal and transgenic mice overexpressing components of the renin-angiotensin system, and their effects on blood pressure regulation. Among those approaches are cardiovascular and neurophysiological techniques (mouse telemetry, cardiovascular function assessment, central microinjections, microdialysis), gene therapy tools including but not limited to siRNA and viral transfection, molecular and recombinant DNA methodology, immunohistochemistry and biochemical methods (e.g., *Circ Res* 113: 1087-1096, 2013; PMID: 24014829). The Louisiana State University Health Sciences Center (*www.medschool.lsuhsc.edu*) is a state-of-the-art facility with well equipped imaging and molecular core facilities. *Required Qualifications:* PhD or MD in basic or health science. *Preferred Qualifications:* A doctoral degree in neurosciences or related field; a strong background in animal physiology, molecular pharmacology, and knowledge of brain circuitry relative to the autonomic nervous system; additional expertise in molecular/cellular biology. *Applicant Instructions:* Send resume and the names of 3 references to: *SOM-Recruits@lsuhsc.edu*; reference: postdoc researcher, pharmacology 0038804. LSU Health is an equal-opportunity employer.

Assistant Professor: The Department of Physiology at Midwestern University-Glendale (*http://www.midwestern.edu/programs_and_admission/az_osteopathic_*

medicine/physiology.html) invites applications for a tenure-track faculty position in physiology at the rank of assistant professor. The successful applicant will participate in a team-teaching approach to meet the needs of various healthcare education graduate programs that exist on our campus. Experience teaching cardiovascular, endocrinology, or renal physiology is highly desired. Candidates whose research areas complement current research strengths are encouraged to apply. Start-up funds and laboratory space are available for the applicant to establish and maintain a successful research program. Individuals must have a PhD degree in physiology or a related field. Previous research experience at the postdoctoral level is required, and prior teaching experience is preferred. Preferential consideration will be given to applications received by 08/01/2016. *About the Department:* The Physiology Department is composed of eight full-time tenured or tenure-track faculty who share the common goal of providing a strong foundation in physiology education to the health science students at Midwestern University. The faculty have diverse research interests, which include genistein and intestinal function in diabetes and cystic fibrosis, diabetes and exercise training, molecular mechanisms of vocal learning in songbirds, caveolins and insulin signaling, neurophysiology and evolution of vocal control, water balance in desert arthropods, and the effects of oxygen on animal physiology and evolution. Faculty research is complemented by a staff of three research technicians. *About the University:* Midwestern University consists of campuses in Illinois and Arizona. Midwestern University's Glendale Campus is a 20-minute drive north of downtown Phoenix, where nearby you'll find everything from major-league sports, fine arts, and fine dining to nature preserves, hiking, camping, and quiet spots where you'll enjoy taking a break to keep your life in balance. *How to Apply:* Applicants should apply online at *www.midwestern.edu*. In the *Quick Links* section, select "Employment at MWU," then "Midwestern University Opportunities." You may search for the job posting by specifying Physiology as the search term, *Arizona* for the location, and *Assistant Professor/Academic & Clinic Coord* for the category. Your online application should include a cover letter, a curriculum vitae, a statement of teaching philosophy (1-2 pages), and a statement of current and future research goals (1-2 pages). Please include the names and contact information of at least three professional references. Please submit your application materials as a single PDF file. For more information about this position, contact Michael Quinlan, PhD, at *mquinl@midwestern.edu*. Midwestern University is an equal-opportunity/affirmative-action employer that does not discriminate against an employee or applicant based on race, color, religion, gender, national origin, disability, or veterans status, in accord with 41 C.F.R. 60-1.4(a), 250.5(a), 300.5(a), and 741.5(a). We maintain a drug-free workplace and perform pre-employment substance abuse testing.

Chair: The LSU Health Sciences Center in Shreveport (LSUHSC-S) seeks applicants for Chair of the Department of Cellular Biology and Anatomy. The successful candidate should have a graduate degree (PhD and/or MD), an impressive record of academic achievement and leadership, and current national funding in an area that complements the existing departmental research strength in cardiovascular disease. The candidate must have experience mentoring graduate students, postdoctoral fellows, and junior faculty, as well as a commitment to the educational mission of the medical school. This is an exciting opportunity with resources provided to invigorate the department and create a competitive research program. The position includes a generous seed package and research space for the chair-holder, the opportunity to recruit additional faculty with competitive seed packages and research space, and funding to expand the research infrastructure of the Department. Numerous outstanding research core facilities are available, staffed by dedicated research associates and scientific advisors. The LSUHSC-S is located in northwest Louisiana, one of the fastest-developing regions within the state. The Shreveport-Bossier City area, with a population of 325,000, is a major regional cultural and recreational center, and is within driving distance from larger metroplexes, such as Dallas-Fort Worth and Houston. Interested candidates may submit a curriculum vitae, letter of interest, and letters of reference to *AnatomyChairSearch@lsuhsc.edu*. LSUHSC-S is an equal-opportunity employer, and all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability status, protected veteran status, or any other characteristic protected by law.

Director: The Lake Erie College of Osteopathic Medicine has opened a search for a Director of Physiology. We are looking for a seasoned educator/leader to lead the Physiology team. The successful candidate will have a terminal degree (PhD, DO, or MD) with a minimum of 5 years' demonstrated excellence in teaching and experience administering a medical physiology course. Teaching responsibilities include the College of Medicine, School of Pharmacy, and Post-Baccalaureate programs. All faculty members are expected to participate in research or scholarly activity. Faculty rank and salary are dependent on qualifications and experience. An applicant must complete the online application at *Director of Physiology* and upload a current curriculum vitae (CV) to the application site. The applicant must also e-mail a cover letter outlining how he/she would enhance the educational mission of LECOM, a statement of teaching philosophy, and contact information for three professional references to *hr@lecom.edu*. EOE/AA M/F/D/V. For more information about LECOM, please visit our website at *www.lecom.edu*. ●

Meetings & Congresses

2016

July 6-9

21st Annual Congress of the European College of Sports Science, Vienna, Austria. *Information:* internet: *http://ecss-congress.eu/2016/16/*

July 21-25

12th International Congress of Cell Biology, Prague, Czech Republic. *Information:* internet: *http://www.cscb.cz/*

July 29-31

APS/TPS Joint Meeting: Physiology 2016, Dublin, Ireland. *Information:* internet: *http://www.physiology2016.org/*; *#Physiology2016*

August 4-8

Society for Developmental Biology 75th Annual Meeting: International Society of Differentiation 19th International Conference, Boston, MA. *Information:* e-mail: *sdb@sdbonline.org*; internet: *https://www.sdbonline.org/2016mtg*

August 23-26

2016 Cardiac Physiome Workshop, Seoul, Korea. *Information:* internet: *https://www.imagwiki.nibib.nih.gov/msm-meetings/2016-cardiac-physiome-workshop*

August 24-27

APS Conference: Inflammation, Immunity and Cardiovascular Disease, Westminster, Colorado. *Information:* internet: *http://www.the-aps.org/Inflammation*; #IICVD16

September 5-8

7th International Congress of the African Association of Physiological Sciences, Lagos, Nigera. *Information:* internet: *http://aapslagos2016.org/*

September 8-10

6th Annual Meeting of the North American Artery Society (NAA) - Arterial Dysfunction in Cardiometabolic Disorders: Advances in Mechanisms, Diagnosis and Treatment, Chicago, IL. *Information:* Matthew Hansen, Hansen Global Event Management, LLC;. e-mail: *naa@hansenglobalevents.com*; internet: *http://naartery.org/page-1710768*

September 9-11

ILCA 2016 - The International liver Cancer Association's 10th Annual Conference, Vancouver, Canada. Information: internet: *http://www.ilca2016.org*

September 18-21

2016 SPS/CSPT/JSPS Joint Meeting, Vancouver, BC, Canada. *Information:* internet: *http://www.safetypharmacology.org/am2016/*

September 25-28

2016 International Conference on Physiological Sciences, Beijing, China. *Information:* internet: *http://www.pco-online.com/icps2016*

November 2-4

APS Intersociety Meeting: The Integrative Biology of Exercise VII, Phoenix, Arizonia. *Information:* internet: *http://www.the-aps.org/mm/Conferences/APS-Conferences/2016-Conferences/Exercise*; *#IBExercise7*

2017

April 22-26

2017 Experimental Biology, Chicago, IL.

May 27-June 1

International Neuromodulation Society 13th World Congress, Edinburgh, Scotland. *Information:* internet: *http://www.neuromodulation.com/ins-congress*

August 1-5

IUPS 38th World Congress: Rhythms of Life, Rio de Janeiro, Brazil. *Information:* Internet: *http://iups2017.com/*

Meetings and Conferences

Physiology 2016
July 29-31, 2016 • Dublin, Ireland

APS Conference:
Inflammation, Immunity, and Cardiovascular Disease
August 24-27, 2016 • Westminster, Colorado

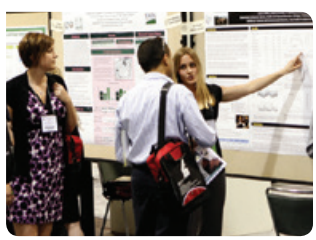
APS Intersociety Meeting:
The Integrative Biology of Exercise VII
November 2-4, 2016 • Phoenix, Arizona

Experimental Biology 2017
April 22-26, 2017 • Chicago, Illinois

APS is also participating in the following meeting

2016 International Conference of Physiological Sciences
September 25-28, 2016 • Beijing, China





For more information on APS meetings, please visit:
the-aps.org/conferences

APS Members receive discounted registration to EB and APS Conferences!
The American Physiological Society usually holds one or more specialty conferences each year. In addition, APS joins with other societies to sponsor Intersociety Meetings as interest warrants. Please send an email to: meetings@the-aps.org for questions or to propose APS Conferences.

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