

THE Physiologist MAGAZINE

MAY 2023

NEW APS TOOLS
TO MAP OUT
A SATISFYING
CAREER **24**

HOW PHYSIOLOGISTS
ARE ADVANCING
SCIENCE IN
NEURODEGENERATIVE
DISEASES **30**

FARM TO LAB

Meet Willis “Rick” Samson, PhD,
DSc, FAPS: discoverer, lab leader
and 96th president of APS.



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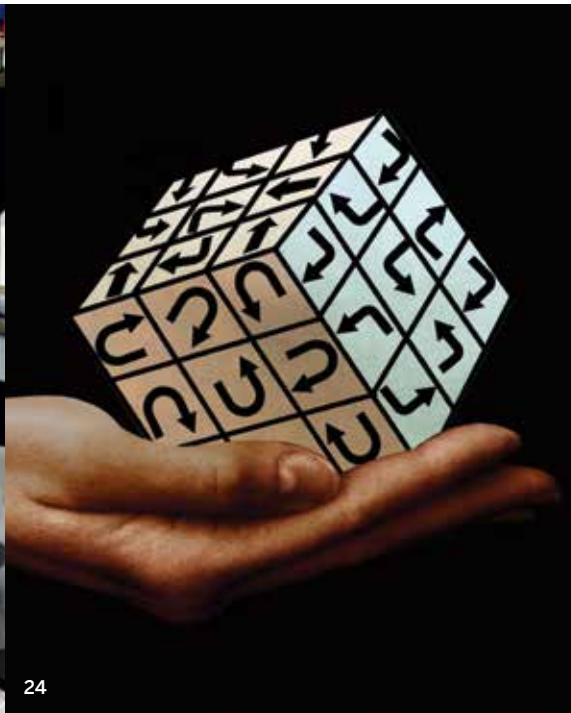
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CAREER NAVIGATOR

Some physiologists move up the academic research ladder, while others explore career opportunities in the government, nonprofit organizations or careers outside the lab, such as science communication, teaching or administration. Learn about career opportunities in all these areas with our new Career Navigator.

CAREER GATEWAY

A successful scientific career requires more than just scientific expertise. To maximize a career in science, investigators, clinicians and educators need a well-rounded professional skill set. The APS Career Gateway provides physiologists the tools for every step of their career journey.

JOB BOARD

Looking for the next step in your career in science? Visit APS' new tech-enabled job board connecting members of our scientific community with career opportunities across academia, government, industry and nonprofits. Find the ideal match for your experience and expertise.

Learn more at [physiology.org/careerresources](https://www.physiology.org/careerresources).

Time to Analyze Your Summit Experience

BY MEEGHAN DE CAGNA, MSC, CAE



Dear reader,

I'm writing this letter surrounded by a sea of luggage, clothes strewn everywhere, technology piled up and more notebooks and files than I can count. Today, I'm packing for the 2023 American Physiology Summit. When you actually receive this edition of the magazine, the Summit will have come and gone, and I hope we will collectively be celebrating its resounding success.

But we don't want to leave that to chance, so measuring and evaluating what worked or didn't, what could be improved or eliminated, is a critical next step in the evolution of the meeting. The old adage of measuring what matters comes alive in the next several weeks.

I know most people don't like filling out surveys and evaluation forms, but we sincerely want and need your feedback. We've got website and mobile app analytics; we'll know which sessions you attended as we scanned everyone going into session rooms. For the first time, we'll understand the draw of specific session titles, whether or not you liked the game-changer topics, whether a 7 a.m. session is a little too early for our crowd, or if you love a good late-night party. Some of the metrics will be about the science, and some will be about the overall Summit experience. We truly want to understand it all.

Believe it or not, there is already a working group in place for Summit 2024. Your input is vital to help set the direction for what comes

next. Just as we did to build the first Summit, we are relying on you, our members, to chart our course for continued excellence. Won't you help us by completing the attendee survey? I think it's still right there in your inbox.

OUR FEATURES

Our cover article this month features our new APS president, Willis "Rick" Samson, PhD, DSc, FAPS. You'll read how Samson's love for animals led him to science—but with a few detours along the way. You'll learn what he focuses his research on now and why. And you'll hear his vision as APS president, as he takes the helm at the Summit. It's all on page 18.

In our science-focused feature this month, on page 30, you'll read how physiologists are contributing to the literature on neurodegenerative diseases. There are more than 600 known neurologic disorders; some of the more well-known ones, such as Alzheimer's disease,

Parkinson's disease, amyotrophic lateral sclerosis (ALS) and other motor neuron diseases, affect nearly 7 million people in the U.S. Learn how physiologists are trying to uncover some of the vast unknowns surrounding these diseases.

In our third feature, we wanted to share our revamped APS career tools,

which offer an incredible array of resources to help you navigate your career path, explore new opportunities, find jobs and more. We developed these tools—with a lot of input from members—specifically to help you strive and succeed. Turn to page 24 to see what's available and then head to our website to check them out.

WE WANT TO HEAR FROM YOU

Remember that you, members of the APS community, are the engine that drives *The Physiologist Magazine*. Please email tphysmag@physiology.org to share any feedback, suggestions and story ideas. 📧

Meeghan De Cagna, MSc, CAE, is APS chief community and learning officer and associate publisher of *The Physiologist Magazine*. You can reach her at meg@physiology.org.

“Measuring and evaluating what worked or didn't, what could be improved or eliminated, is a critical next step in the evolution of the meeting. The old adage of measuring what matters comes alive in the next several weeks.”

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Scott Steen, CAE, FASAE

*Publisher
Executive Director*

Meeghan De Cagna, MSc, CAE

*Associate Publisher
Chief Community and Learning Officer*

Melanie Padgett Powers

Managing Editor

FREELANCE WRITERS

Dara Chadwick, Mike De Socio, Jennifer L.W. Fink

CONTRIBUTORS

Sean Boyer; Brooke Bruthers; Audra Cox, PhD, ELS; Kristin Dougher, MBA; Claire Edwards; Mark Eichelberg, PhD;
Kirsten Gossett; Alissa Hatfield; Rebecca Osthus, PhD; Erica Roth, MS

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CALL FOR APPLICATIONS

SELECTION

BOARD CHAIR

Deadlines

Nominations due:

May 15, 2023

Applications due:

June 1, 2023

How to Nominate

Applications briefly summarizing your qualifications and goals for *APSselect*, accompanied by a curriculum vitae should be sent via email to Wolfgang Kuebler, MD, FAPS, incoming chair of the APS Publications Committee, care of Charmon Kight (ckight@physiology.org) in the APS Publications Department.

APSselect®

Nominations and applications are invited for the position of chair of the *APSselect* (journals.physiology.org/apselect) Selection Board to succeed Linda Samuelson, PhD, FAPS, who will complete her term as chair on December 31, 2023. The American Physiological Society (APS) Publications Committee plans to interview candidates in the summer of 2023.

Ideal candidates will have past or present knowledge of APS research journals through the role of:

- publications committee member,
- editor,
- deputy editor,
- associate editor,
- editorial board member,
- *APSselect* associate editor, or
- *APSselect* selection board member.



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this opportunity.



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APSselect.

The Call of Industry

Increasingly, scientists are considering the transition from academia to industry. What does it take to make that move? APS Executive Director Scott Steen, CAE, FASAE, spoke to two APS members who recently took the plunge: Katherine Grabek, PhD, chief science officer and co-founder of Fauna Bio in Emeryville, California, and Corey Reynolds, PhD, regional medical scientific director for Merck.

Grabek: At Fauna Bio, our focus is mining the extraordinary genomics of mammals that have, over the course of their evolution, adapted extreme physiology. In particular, we're looking at hibernating mammals and how they're naturally protected from insult that would lead to disease or death in us. We're looking at the genes that they're using and then identifying those as targets, to then go and validate as potential therapies for human disease.

Reynolds: My job involves building relationships with physicians in the therapeutic areas of heart failure, NASH (nonalcoholic steatohepatitis), atherosclerosis and thrombosis. Those relationships often develop into those scientific leaders taking part in clinical trials that we're running.

Steen: How did you end up where you are?

Reynolds: I was aware of the medical science liaison role when I was in graduate school. I met somebody who was in that role who told me, "Go do a postdoc so that you'll have that experience on your resume, and then if you decide to go into industry, you'll have that already built up." So I went and did a postdoc, enjoyed the work that I was doing, and stayed at the Baylor College of Medicine for almost 12 years. But toward the end, I spent less

time actually doing science, so I made the decision to actively pursue a medical science liaison role within industry.

Grabek: I'd always been curious about industry. At the University of Colorado, where I did my PhD, it was very focused on the academic track and that's what you did. Year four of my postdoc at Stanford rolls around and I had a little bit of this existential crisis of, do I really want to be an academic? That year was quite difficult for me. I started looking at other careers. Our postdoc adviser, Carlos Bustamante, approached a couple of my co-founders about starting a company around animal genomics. So, we three would spend our lunches brainstorming: What would we do with this, and how would we start this company? We met an investor not long thereafter and had seed funding pretty soon after that. We had about two weeks to decide, do you want to start a company or not? We really wanted to

go for it because we felt when else is this going to happen?

"The skills I obtained in graduate school, in postdoc and academia were actually quite transferrable—specifically the teaching I did during that time."

—Corey Reynolds, PhD

Steen: How transferrable was the knowledge you gained in academia to an industry environment?

Reynolds: The skills I obtained in graduate school, in postdoc and academia were actually quite transferrable—specifically the teaching I

did during that time. You can always tell people who have teaching experience because we're a lot more comfortable talking to people and explaining materials and science. Some of the things that I wasn't prepared for: I came into this job really green. I thought that the doctors would be excited to talk to me, and that's not always the case. You have to be very persistent in the way that you go about trying to schedule meetings. I won't say schmoozing, but getting in good with the admin so that you can get to the doctors. I would also say that at Baylor I was used to a routine, and industry is not like that at all. It changes daily. That was probably



Scott Steen, CAE, FASAE

the hardest part for me to accept—the constant change that was going on around me.

Grabek: I learned about learning to be independent and design my own projects and learn deep knowledge on things I had no knowledge on and building the confidence that I could do that. But there are a few skills I had to unlearn. One of them that was a big change for me is going from being an individual—this is your project and you're going to be the first author on this paper. [But] in industry and in startups, it doesn't work like that.

Steen: Where do people struggle the most?

Reynolds: It's folklore that we're great at science but we can't communicate with people, that we're just kind of lab rats. And that's, as you see here today, that's not the case at all. But there are some people who are just not comfortable communicating. They're not very good at reading a room. They're not very good at reading body language. Those are the ones that aren't successful at being in the role that I'm in.

Grabek: I would say it would be working with others. Maybe they're great scientists and they're great at the bench, or they're great doing analysis on the computer, but they need to work with others and communicate and work in a team.

Steen: What are one or two things that have made you successful as a scientist in industry?

Reynolds: My ability to communicate science to pretty much anyone regardless of their level of education. The second would be my



Katherine Grabek, PhD



Corey Reynolds, PhD

ability to communicate with ease. Talking to people isn't difficult for me.

Grabek: For better or for worse, I can be very stubborn so I can push things forward that I have very great conviction in. And then also being able to learn very quickly and not be scared or intimidated on something I don't know anything about. Because I have the mindset of "how hard can it be? I can learn this." And then, just being able to be flexible.

Steen: Do you have any "I wish I had known"?

Grabek: I wish I had known about LinkedIn a little bit earlier and was able to reach out to scientists and industry, and do informational interviews or do a consulting project, and just gain a little bit more experience, and get a peek into the world of industry, instead of it being a mystery to me.

Reynolds: I wish I would've known how quickly things change in industry. Literally, you may get an email or call that says, "oh, we decided to get rid of

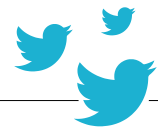
this team," and then tomorrow you're out of a job. I did not understand that aspect of industry at all.

Steen: It sounds like both of you feel like you ended up in exactly the right place and that this is the career that you would've wanted.

Grabek: Yes, for sure.

Reynolds: Yes, I think mine was ordered in the way it was supposed to be. ☺

View the conversation in full at www.physiology.org/evolution.



You can feel the pride and excitement of teaching and learning about physiology in these tweets.

Share your story with us and it may appear in the next issue of *The Physiologist Magazine*. Email your thoughts—and links to your tweets and posts—to tphysmag@physiology.org.



Tami
@hyponaqueen

Thanks Jordan for sharing your time and expertise on BFR training with my class this morning 🙏! One good 45 minute lecture is worth reading 100+ scientific articles. YOU will lead NBA science forward 🙌🏀🍀🍀



6:00 PM · Mar 8, 2023



Jason Keeler, PhD
@JasonKeelerphd

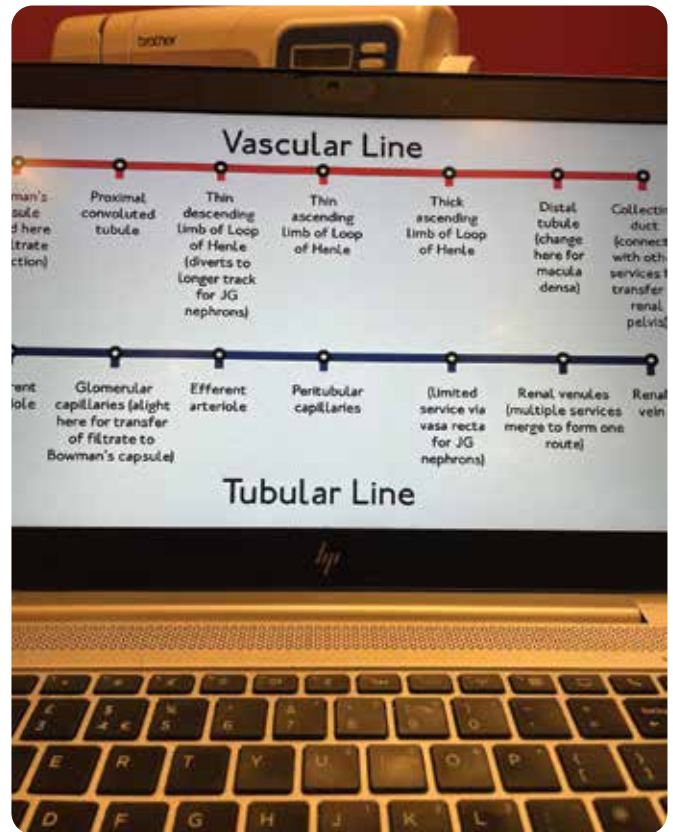
Submitted a manuscript last night. Hopefully, reviewer 2 is kind to to us! 🙏

9:33 AM · Mar 7, 2023



Derek Scott
@Prof_DerekScott

Trying a new approach to help students to learn about the nephron...



4:16 PM · Mar 7, 2023



Ross Wohlgenuth
@rpwohlgenuth

My first first-author paper just got accepted!! Am I a real scientist yet?

8:10 PM · Mar 9, 2023



Austin Robinson, PhD
@AusRob_PhD

😄 @braxtonlinder2 going hard making ketone ester and placebo drinks for our salt vs ketone study (KEAS; NCT05545501) which will be part of his dissertation.



5:53 PM · Mar 8, 2023



Erin Bruce, PhD
@eBruce_phd

Nightly Prayers w/kids

Me: I'm thankful I won an award
9yo: Was it the Nobel Peace Prize?
Me: No
9yo: Well, we'll just call it the Nobel Peace Prize
Me: Okay, Thanks

@APSPHysiology you've been officially upgraded #APSteaching #MedEd #UFPandA

7:49 AM · Mar 8, 2023



Jessi Cucinello-Ragland, PhD
@jcucinello

St. Louis here we come!!
Just realized I never made it science twitter official, but I'm excited to announce that I'll be starting my postdoc this summer in the @jomoronc lab!



12:02 PM · Mar 9, 2023



Matt Stock, PhD
@MattStockPhD

Occasionally, students need to hear these 5 words from their PI: "I am proud of you."

8:55 PM · Mar 9, 2023

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LABNOTES

MENTORING Q&A YOUR QUESTIONS ANSWERED
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STATS & FACTS PHYSIOLOGY BY THE NUMBERS
UNDER THE MICROSCOPE OUR MEMBERS, UP CLOSE
PUBLISH WITH POLISH BUILD A BETTER RESEARCH PAPER

STATS & FACTS

115.4 million

The expected number of people living with dementia by 2050.

World Health Organization

RESEARCH FIZZ



Multisystem physiological perspective of human frailty and its modulation by physical activity

This review suggests that a multiorgan approach with state-of-art technologies that look at organ structure and function can help scientists better understand and treat frailty.

Physiological Reviews, April 2023

<https://doi.org/10.1152/physrev.00037.2021>

STATS & FACTS

~105

The number of fresh resources available in the Career Gateway at any given time.

APS



MENTORING Q&A | PHD SKILLS

Talk It Through

The importance of communication and navigating tough choices.

Each issue, we ask a trainee or early-career member to pose their career questions to an established investigator and mentor. Here, Luis Angel Rivera Arce, a fifth-year PhD candidate at Ponce Health Sciences University in Puerto Rico, asks Jennifer C. Sullivan, PhD, dean of the graduate school and professor of physiology at Medical College of Georgia at Augusta University, for advice on navigating life-changing decisions.

Q: What are the most important core skills for graduate students to acquire by the end of their PhD and why?

A: The core skills that will serve all students best are not going to be technical; they are going to be the skills that they use in all facets of their lives: the

ability to articulate their thoughts to a wide range of audiences, confidence in themselves as scientists and the ability to get back up and try again. Effective communication is crucial, and learning to confidently communicate with leaders in the field, peers and laypersons will expand your

“The core skills that will serve all students best are ... the skills that they use in all facets of their lives: the ability to articulate their thoughts to a wide range of audiences, confidence in themselves as scientists and the ability to get back up and try again.”

network and ensure you always make a positive impression. In addition, no matter what career path you choose or how your personal life unfolds, there will be bad days. You need the resiliency to get up, keep moving forward and work to find a solution.

Q: Sometimes the graduate student's goals don't align with the adviser's goals for the student; what advice would you give for this type of graduate student?

A: The most important decision you will make in graduate school is who will serve as your major adviser. I work with students often in our program, and I always tell them that the “fit” between

mentor and mentee is much more important than the project or the techniques employed. Use rotations to determine if the mentoring styles and goals align. If you note early on that the goals do not align, find another adviser. If the student is farther along in the pro-

gram, communicate your needs and goals clearly and respectfully to your adviser. Articulate what your goals are and why. If the student still does not feel heard, include the committee or another advocate to help navigate any misalignment.

Q: Sometimes circumstances make you change direction or even a career path; what recommendations would you give graduate students, or even postdocs, navigating life-changing circumstances?

A: Know yourself: What are your values? What are your passions? What makes you happy? Spend time assessing your needs for a fulfilled life. I do not say this lightly, but the opportunities for a do-over are few. As you consider a change, take time to think through the implications both personally and professionally. Talk to the people you trust—your

family, partner, friends, colleagues and mentors. Life is too short to not enjoy what you are doing, and regret will serve no one. If a challenge comes up, look for opportunities that get you excited and fully embrace any change.

Q: What are the current challenges in academia, and how do you think the new generation of physiologists can make a change?

A: Funding is always a challenge, and the uncertainty that comes with the quest for the next grant can be highly stressful. I think collaboration is often a help, and I imagine the next generation will continue to be more open to team science and working together for the greater good. Having an engaged group of collaborators not only helps in funding, but in providing a strong network and support system to keep the whole team more positive and productive. ☺

Got a career question you'd like to submit? Email it to tphysmag@physiology.org. We may use it in an upcoming Mentoring Q&A.

STATS & FACTS

September 29, 2022

The day the U.S. Food and Drug Administration approved Relyvrio, a drug to treat amyotrophic lateral sclerosis (ALS). Clinical trials for Relyvrio were made possible through the 2014 viral “Ice Bucket Challenge” fundraiser for the ALS Association.

ALS Association

RESEARCH FIZZ



Cumulative insulin resistance and hyperglycaemia with arterial stiffness and carotid IMT progression in 1,779 adolescents: A 9-Year Longitudinal Cohort Study

This study suggests late adolescence may be the best time to manage insulin levels and insulin resistance to minimize stiffening of the arteries.

American Journal of Physiology-Endocrinology and Metabolism, February 2023

<https://doi.org/10.1152/ajpendo.00008.2023>

STATS & FACTS

35,435

Average job views per month in 2022 on the APS Job Board.

APS

RESEARCH FIZZ



**Electrocortico-
graphy reveals the
dynamics of
famous voice responses in
human fusiform gyrus**

This study used electrocortico-
graphy to examine the
interactions from the auditory
and visual cortices that lead to
famous voice recognition.

Journal of Neurophysiology, February 2023

<https://doi.org/10.1152/jn.00459.2022>

STATS & FACTS

**5 hours
per day**

The average time spent by
friends and family caring for
someone living with dementia.

World Health Organization

RESEARCH FIZZ



**Lactate as a
myokine and
exerkine: drivers
and signals of physiology
and metabolism**

This review explores how lactate
works in diverse ways to affect
physiology and metabolism.

Journal of Applied Physiology, March 2023

<https://doi.org/10.1152/jappphysiol.00497.2022>

STATS & FACTS

~90%

The portion of people living
with dementia with no known
inherited link to the disease.

Johns Hopkins Pedersen Brain Science Institute



POLICY IQ | NIH PEER REVIEW

**NIH Plans to Restructure
Peer Review Criteria**

The National Institutes of Health (NIH) receives more than 55,000 research project grant applications each year. It relies on the assessment of expert peer reviewers to evaluate the scientific merit of each application. Although NIH peer review is a time-tested process of identifying the most promising research, the scientific community has raised concerns about some aspects of the system. The NIH Center for Scientific Review is developing a restructured set of peer review criteria in an attempt to address two major concerns: the potential for bias to influence an application's score and the increasing burden on reviewers due to an expanding list of administrative and compliance items in the review criteria.

NIH released a draft of the updated review criteria on December 8, 2022, and invited feedback from the scientific commu-

nity. Among the changes proposed in the draft is a reorganization of the five main review criteria: Significance, Investigator(s),

Innovation, Approach and Environment. While NIH is required by regulation to include these factors in the evaluation of grants, there is latitude for NIH to determine how (or whether) these factors are numerically evaluated and how they affect a grant's final impact score.

The updated review criteria would consolidate the five main review criteria into three factors, two of which are individually scored by reviewers:

1. Importance of the research (Significance and Innovation, scored 1–9)
2. Feasibility and rigor (Approach, scored 1–9)
3. Expertise and resources (Investigator(s) and Environment, not individually scored)

Rather than providing numerical scores for the investigator and environment, which can

potentially allow implicit bias to unfairly favor investigators and institutions that are already well-funded, reviewers will indicate whether the investigator and the environment are fully capable and appropriate, respectively, or if additional expertise or resources are needed. If reviewers indicate that the investigator or the environment are insufficient, they will be required to describe any gaps identified.

To develop a response to an NIH Request for Information covering the proposal, APS staff conferred with members of the Science Policy and the Animal Care & Experimentation committees. Opinions were generally favorable toward the rearrangement of the main review criteria, noting that the two reviewer-scored factors serve to focus the evaluation of a proposal on the most important considerations for scientific and technical merit.

However, while the change to evaluation of the investigator and environment may remove one element of bias, committee members underscored that other sources of implicit bias exist and that NIH will need to follow up on its implementation of the new review criteria with a holistic approach that includes evaluating study section outcomes, updating training modules and

rubrics for reviewers, and encouraging appropriate use of the full range of the 1–9 scoring system.

NIH will need time to evaluate the comments submitted in response to the draft review criteria before releasing a final version and developing a timeline for implementation.

NIH may not be the only agency preparing to shake up grant review. On December 1, 2022, the National Science Foundation (NSF) established a special commission charged with assessing NSF merit review policy and criteria. The commission's plans (currently a work in progress) include conducting research to assess the current review criteria and drafting recommendations for the National Science Board's consideration by May 2024.

The merit review processes at NIH and NSF are cornerstones of the basic research funding model in the U.S. and help ensure that public tax dollars are spent on the most impactful science. It is encouraging to see NIH addressing concerns from the scientific community about the fairness of review criteria and the limited bandwidth of reviewers. APS encourages both agencies to continue to adapt to the needs of the scientific community and improve the grant review process. 📧

POLICY IQ | RESEARCH BUDGETS

APS Makes Bold Budget Requests for Federal Agencies

As Congress begins the process of setting budgets for federal agencies and programs in fiscal year (FY) 2024, APS is recommending significant increases in funding for research at the following agencies:

National Institutes of Health (NIH): NIH plays a key role in advancing basic biomedical research and training the next generation of scientists. APS recommends that NIH receive a budget of at least \$50.9 billion in FY 2024, plus additional funding for the Advanced Research Projects Agency for Health (ARPA-H). While supportive of a robust allocation for ARPA-H, APS urges Congress to ensure that funding for the agency supplements, rather than supplants, support for the base budget of NIH. Providing \$50.9 billion for NIH's core programs would provide an inflationary increase plus 5% growth over the current funding level.

National Science Foundation (NSF): After many years of flat funding, NSF was reinvigorated with an infusion of resources in FY 2023. For FY 2024, APS recommends the agency receive \$15.7 billion, the amount authorized for NSF in last year's landmark CHIPS and Science Act. While this would represent more than a 50% increase in the agency's budget, this level of funding is necessary to accomplish the ambitious goals laid out in the CHIPS and Science Act.

Medical and Prosthetic Research Program: This program at the Department of Veterans Affairs supports research into conditions that affect veterans, but the knowledge gained improves the lives of all Americans. In FY 2024, APS recommends \$980 million for the program to allow the program to grow and continue to develop state-of-the-art treatments for veterans.

NASA: NASA funds research aimed at understanding how space travel affects humans and other organisms. APS recommends increases for both the NASA Space Biology Program and the Human Research Program.

Visit www.physiology.org/advocacy for up-to-date information on federal funding and to send a message to your congressional delegation in support of research. 📧



RESEARCH FIZZ



Early-stage Alzheimer's disease: Are skeletal muscle and exercise the key?

This mini review explores how exercise could play a role in the prevention of and delayed progression of Alzheimer's disease.

Journal of Applied Physiology, March 2023
<https://doi.org/10.1152/japphysiol.00659.2022>

STATS & FACTS

300

The number of APS members who participated in the development of Career Gateway.

APS

RESEARCH FIZZ



Myofibroblast-specific inhibition of the Rho kinase-MRTF-SRF pathway using nanotechnology for the prevention of pulmonary fibrosis

This first-of-its-kind study shows inhibiting a myofibroblast pathway to the lung can reduce drug-induced pulmonary fibrosis.

American Journal of Physiology-Lung Cellular and Molecular Physiology, February 2023
<https://doi.org/10.1152/ajplung.00086.2022>



Coggan with his kids, Maddie and Gavin, on a hike at Cataract Falls State Recreation Area in Spencer, Indiana.

UNDER THE MICROSCOPE

Rapid Fire Q&A

Andrew R. Coggan, PhD, shares a lab mishap story, the lab technique he never learned and the question we should have asked.

Q: How has the pandemic changed the way you work?

A: I'm more likely to work from home or meet virtually than before. That said, I still prefer being on campus, as I am more productive there.

Q: "Old school" technique you're most proud of mastering?

A: Indirect calorimetry. It can be a highly useful method, but the devil is in the details, and far too many people are willing to just rely on their "black box" metabolic cart.

Q: Most challenging laboratory technique you've learned to use?

A: Measurement of plasma catecholamines via high-performance liquid chromatography. It took almost

a year to get things working really well, but I'm stubborn.

Q: Favorite lab mishap story you can share without incriminating the innocent?

A: Once, when making periodic acid-Schiff's reagent from scratch (to stain for capillaries), I accidentally let the flask in which I was dissolving the pararosaniline dye boil over, splattering the wall with fuchsia-colored liquid. It couldn't be removed, so the entire wall had to be repainted.

Q: Best "MacGyver" moment in the lab?

A: I built a "hot box" for sampling arterialized venous blood that fit over the handlebar of a cycle ergometer. I used a Styrofoam container, paper cup, light bulb,

light socket, extension cord and meat thermometer.

Q: If you could meet any scientist (living or dead) who would it be and why?

A: Probably Archibald Vivian (A.V.) Hill. I think we would hit it off quite well due to his broad interests, quantitative perspective and reported personality traits.

Q: If you could do a sabbatical with any scientist (living or dead) who would it be and why?

A: Anybody who could teach me how to do Western blotting. I missed that boat while off learning other techniques.

Q: Most influential scientist on your career?

A: I have been fortunate to have worked with a number of distinguished scientists. The one who had the greatest influence on me though was my PhD mentor, Ed Coyle, PhD, at the University of Texas-Austin.



Dave Costill, PhD, and Coggan on the bike doing a VO₂max test—trying to break 60 mL/min/kg when he turned 60 years old.

Photos, left and facing page, courtesy of Andrew R. Coggan, PhD



Coggan and his wife, Angie, on a bike ride.

Q: Items on your lab bench that you are most possessive of?

A: Don't touch my new muscle stimulator—you might be in for quite a shock.

Q: What do you wish the general public understood about science or research?

A: That doing good scientific research is really hard and that the results are often imperfect.

Q: Favorite book about science (fiction or non-fiction)?

A: Charles Tipton's "History of Exercise Physiology." I've always loved learning about the history of my field and why we think the things we do.

Q: No. 1 guilty pleasure?

A: Playing online chess.

Q: Favorite science-related TV show (fictional or factual)?

A: The original "Star Trek."

Q: The scientific discovery or invention (made by someone else) that you wish you had made?

A: Heavier-than-air flight.

Q: Biggest misconception about physiology/physiologists is ... in five words?

A: That we only study nonhumans.

Q: Favorite way to spend a free hour?

A: Riding my bike.

Q: Most valuable quality in a colleague?

A: Dedication to doing the job right.

Q: Tell us a surprising fact about you.

A: I built a wind tunnel in my basement.

Q: Title you'd use on your autobiography?

A: "Feelin' Like a Little Kid."

Q: How would you describe your job to a child?

A: I get paid to experiment on people to learn about exercise, then write reports about it.

Q: Favorite charities you support?

A: My family is involved with the Misty Eyes Animal Center (www.mistyeyes.org) in Avon, Indiana.

Q: One thing every researcher/scientist should try at least once in their life?

A: Being a research participant themselves.

Q: Next book on your reading list?

A: Major Taylor's autobiography, "The Fastest Bicycle Rider in the World" (although I don't read many

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From Summit to Submission

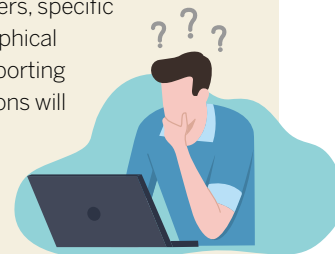
Welcome home from an invigorating American Physiology Summit 2023! It's now time to write up your data and submit a manuscript, but where to begin? Preparing a manuscript takes thought and planning, but it's not so different from executing a research project.

A natural starting place is defining your area of study. Based on your research topic, you can choose where to submit. APS journals offer a helpful "Which APS Journal?" webpage (www.journals.physiology.org/which-journal) that succinctly summarizes each journal's topic focus. From there you can easily access detailed scope descriptions to find the perfect home for your data.

Just like you review protocols before ever picking up a pipette, you should familiarize yourself with the author instructions before writing (www.journals.physiology.org/author-info). Although the basic structure of a research article carries across publishers, specific requirements differ. Do you need a graphical abstract? How should you handle supporting and source data? The author instructions will answer these questions and more.

When you have results, you present them for optimum insight. Likewise, prepare your paper to maximize reader interest. Let your abstract summarize your results and promote the significance of your findings. Create an engaging title that concisely sells your data and conclusions. Keywords drive discoverability and increase readership, so don't underestimate their importance.

Writing may seem daunting, but compared to the intellectual and experimental effort you already put into your project, can it really be that hard? Go get published! 📖



books, so I probably won't get around to it until next winter).

Q: Go-to tech device?

A: These days, wireless earbuds (and Spotify).

Q: The question we didn't ask that we should have?

A: Are you ever going to retire? 📖

Andrew R. Coggan, PhD, is an associate professor at Indiana

University-Purdue University Indianapolis. He is an exercise physiologist who studies the metabolic and muscular responses and adaptations to exercise in a wide variety of populations. His most recent research has focused upon the effects of dietary nitrate on muscle contractile function in healthy older individuals and patients with heart failure.



Farm *to* Lab

Meet Willis “Rick” Samson, PhD, DSc, FAPS:
discoverer, lab leader and 96th president of APS.

BY MIKE DE SOCIO

When Willis “Rick” Samson, PhD, DSc, FAPS, was growing up in Syracuse, New York, he loved spending time at his grandfather’s dairy farm.

The property, located about an hour away, had been in the family since the turn of the century and had grown to encompass many of the neighboring outfits as tenant farmers. Samson would eagerly chip in, helping his uncles milk the cows and handle all sorts of manual labor. He didn’t mind the 4 a.m. wakeup calls. He simply loved being around the animals and learning all he could about them.



Samson with fellow attendees of the Cayman Peptide Conference in 2016 in Turks and Caicos that Samson organized.

“Being a farmer is awfully hard work. I admire them tremendously. But that wasn’t for me.”

Going into high school, Samson didn’t have any grand plans or academic ambitions. He ran cross-country and track and figured that could be his ticket into college. But as he was considering the path his life might take, Samson also heeded the advice of his father.

“I realized what my father had said: ‘Farming is a tough life,’ which

is why [my dad] decided to go the academic route” and become a medical doctor, Samson says. “And I made the same decision. Being a farmer is awfully hard work. I admire them tremendously. But that wasn’t for me.”

Samson’s interest in animals did translate into a scientific career, just not right away. It wouldn’t be until many years (and detours) later that

he found his way back to biology, eventually settling into the field of physiology. Samson is now a professor of pharmacology and physiology and director of biomedical science graduate programs in the School of Medicine at Saint Louis University (SLU). And he’s the new president of APS, where he hopes to leverage his deep roots in the organization to lead it to an even brighter future.

BACK AND FORTH TO BIOLOGY

Samson arrived at Duke University in 1964 ready to fill his course load with biology labs, but there was just one problem: All of the labs were in the afternoon, the same time as his cross-country practices. He settled

for the next best thing: enrolling in the morning chemistry labs and declaring a chemistry major.

Samson was content to coast along in that track for a while, but in his senior year he finally managed to squeeze a biology lab into his schedule. The course was taught by Knut Schmidt-Nielsen, PhD, a renowned animal physiologist. Samson was utterly captivated by the entertaining, somewhat quirky, professor and felt his interest in animals reignited.

But shortly after graduation, he was bumped off course again. “Uncle Sam knocked on my door, and I ended up first spending a brief time in the Peace Corps and then going into the Army to complete my military mandatory service during the Vietnam War,” Samson says.

After serving with the Peace Corps in the Philippines, he spent three and a half years with the Army in Europe.

“When I got out, I didn’t know really what I was going to do, but I still had this interest in biology. So, I took some more courses in biology and decided that physiology was pretty interesting,” Samson says.

He initially wanted to study at the University of California, San Francisco but was redirected to study under Samuel MacDonald McCann, MD, a neuroendocrine physiologist at the University of Texas (UT).

“I hopped in the car and drove to Dallas for graduate school,” Samson says, where he completed a PhD at the UT Southwestern Medical Center.

Samson forged an academic career that took him from Texas to Missouri and North Dakota, before landing in his current role in St. Louis—coincidentally, his wife’s hometown—some 20 years ago. His twin adult sons also live in the city, one directly across the street with three grandsons.



Top: Gina Yosten, PhD, dresses up like Samson for Halloween.

Bottom: Samson at Christmas 2022 with his twin sons and three grandsons.

At APS, “I realized that it was a place where you could be included, if you worked hard, and were honest, and were a good communicator.”

‘LET THE DATA TELL YOU WHERE TO GO’

For a long time, Samson’s research focused on peptide hormones and their role in reproductive physiology. He eventually pivoted to vasoactive peptides—hormones that act in the kidney and the vasculature—but always stuck with peptides. That is, until about a decade ago, when a graduate student in Samson’s lab shifted the focus of his research once more.

“She got me interested in receptors, the proteins that take the message that hormones deliver,” Samson says. That grad student was Gina Yosten, PhD, who’s now a tenured associate professor alongside Samson at SLU. (Yosten was recently elected to APS Council and serves as the youngest editor of an APS journal, *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology*.) “We’ve had a longstanding successful career looking at receptors. She’s a remarkable scientist,” Samson says.

Their lab has been guided by a dictum that Samson picked up earlier in his career: “Let the data tell you where to go with your science.”

The data have led Samson and Yosten’s lab to discover two new hormones and identify five new receptors. “For years, I did work where we tried to figure out, ‘OK, what does this thing do, or where does it act?’ but we didn’t really discover new things; we were sort of characterizing things that were

known. And what we’ve been doing the last 15 or so years is actually discovering things that no one knew existed,” Samson says.

Those discoveries could be leveraged for the development of therapeutics. One of the hormones they discovered, for example, could be manipulated to help people with Type 1 diabetes who overshoot their insulin and become hypoglycemic. Another hormone could lower blood pressure for pregnant people who have preeclampsia. And one of the newly identified receptors could be used to treat chronic pain or eating disorders.

“You discover things and then you can’t be narrow in your focus,” Samson says. “You have to say, ‘OK, so you found this, now what do you do? What does it do? Where does it act? What can we leverage it into?’”

LEADING APS INTO THE FUTURE

Samson’s connection to APS goes back to the earliest days of his academic career, studying under McCann in Dallas. McCann was active in APS and brought Samson along for the ride.

“There were a lot of characters, but also, it was a very welcoming environment. I mean, even as a postdoc, I got introduced to one after another president of APS,” Samson says. “I realized that it was a place where you could be included, if you worked hard, and were honest, and were a good communicator.”


He caught the bug and quickly ascended through the ranks as a committee trainee, then committee member and eventually editor of the *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology*.

As he takes on the presidency of APS, Samson hopes to bring that welcoming, invigorating experience he had decades ago to a new generation of young scientists.

“I think the most important thing that the president can do is encourage people to be involved,” he says. “And I’m very concerned about the fact that it’s a very old Society; the average age is well over 45. We need to attract young members, get them involved, and keep the Society going by refilling the spots that retirements open up.”

He’s also planning to focus on the finances and governance of APS. “With open access coming, it’s really going to decrease our income stream,” he says. “We’re going to have to really look at our financial model very carefully.”

He’ll also continue the work of the task force to modernize the century-old governance structure of the Society, an effort he’s been leading under APS Immediate Past President Dee Silverthorn, PhD, FAPS.

“We have to be transparent in what we’re doing; we have to get people involved and invested. And we have to focus on the future,” Samson says. 

Contemplating graduate school as the next step in your education and career?

Search the American Physiological Society's **Graduate Physiology and Biomedical Science Program Catalog**. This online directory is designed to help early-career physiologists and undergraduate biology or life science students find the ideal graduate program. New additions are added frequently.

Are you a professor or mentor?

Share this catalog with your undergraduate and postbaccalaureate students to help grow the next generation of physiologists.

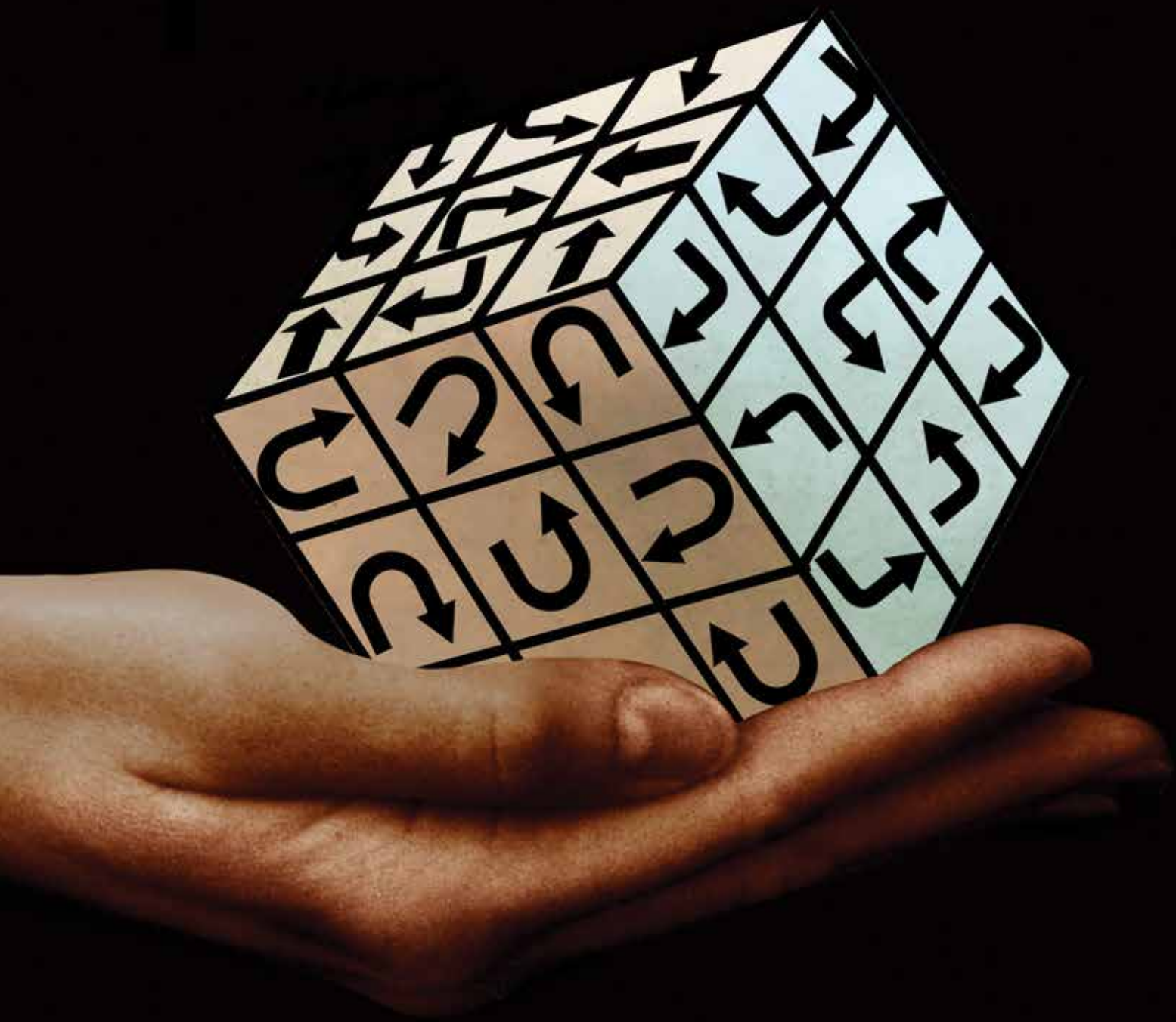
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Career Planning



New and updated APS tools can help you map out a satisfying career.

BY JENNIFER L.W. FINK

Are you doing exactly what you thought you'd be doing in your career? For many physiologists, the answer is no, as detours and seemingly small decisions—take this professor's class over that one, connect with that person at a conference—can lead to different opportunities and career paths.

John Harrell, PhD, a research physiologist with the U.S. Air Force, initially planned a career in academia.

David Pollock, PhD, FAPS, “had no idea” what he was going to do when he started college. He discovered he liked physiology, so he attended graduate school, intending to be a teacher “in a sport coat with patches on the elbows, sitting in a coffee shop and talking

to students.” Today, after stints in industry and academia, Pollack is the director of the Cardio-Renal Physiology and Medicine Section, a translational research program, at the University of Alabama-Birmingham (UAB).

Sherry Adesina, PhD, planned to work in government. After all, she'd completed an internship with the U.S. Food and Drug Administration during

her last years of graduate school. But while attending an APS conference, she learned about postdoctoral opportunities in industry. Adesina is now a senior medical science liaison for Adaptive Biotechnologies, a company working in immune-driven medicine.

Career planning sounds simple, linear and straightforward, but scientists' interests, needs and opportunities change as they progress through life. That's why Adesina prefers the term "career outline" to "career plan."

"I know I want to advance in my career," she says, "but I don't put strict guardrails on what that looks like. If an interesting or dynamic opportunity presents itself, I want to make sure that I'm agile enough to pursue it."

That flexible mindset is key to a satisfying career and life. "Your career doesn't have to look like anyone else's,"

Adesina says. "It shouldn't, because it's yours, and you get to make it whatever you want."

Most people do best in an environment that suits their personality and preferences. Pollock worked at Harvard's Institute for Circadian Physiology for a couple years after completing his education, and while he enjoyed the prestige of working at Harvard, on a NASA project, he found that "the culture was not a fit for a slow-talking, Midwestern country boy," he says. So, when he was offered a position in the Drug Discovery Division of Abbott Laboratories in Chicago, he took it. He remained in that position until his boss was reassigned and the company wanted him to work in another area.

"The culture changed on me," Pollock says, so he searched for other opportunities and returned to academia.

continued on page 28

APS CAREER GATEWAY

Committing to Professional Development

www.physiology.org/careergateway

Scientific knowledge and know-how will only take you so far. Communication, leadership and management skills are also required for many jobs. The APS Career Gateway provides professional development for physiologists at every step of their career journey. It is considered the "home base" for all the career resources APS offers.

You'll find articles, videos, courses and webinars sorted into three main categories:

1. Leading a Team
2. Managing Your Science
3. Designing Your Career

The Leading a Team section includes videos to help you navigate team dynamics and conflict, among other things. Managing Your Science includes information about funding, scientific rigor and reproducibility, and communicating your science. Designing Your Career contains information about various career paths, as well as articles about professional branding and stress management..

Sherry Adesina, PhD, senior medical science liaison at Adaptive Biotechnologies, encourages fellow physiologists to intentionally grow their skill sets. "Sometimes it's a bit uncomfortable, but you have to be very valiant in your efforts and learning," she says. "I hate public speaking, but I understand the value of being able to eloquently and concisely share scientific concepts, so I push myself to do better."

APS CAREER NAVIGATOR

Exploring Career Opportunities

www.physiology.org/careernavigator

To maintain his students' attention—and expose them to potential career opportunities—John Harrell, PhD, invited a variety of professionals (occupational therapists, athletic trainers, exercise physiologists and more) to speak to his exercise science class at Cincinnati's Xavier University. He noticed an underlying theme: Flexibility provides opportunity.

Harrell had planned a career in academia but realized then that restricting his focus might limit his options. He decided to explore and accepted a contract position at nearby Wright-Patterson Air Force Base. Today, he's a civilian research physiologist with the U.S. Air Force.

As Harrell learned, the tenure track is not the only path to a successful or satisfying career in physiology. But because physiologists must traverse through academia to earn their degrees, few fully understand the breadth of career opportunities available outside institutions of higher learning.

The APS Career Navigator allows physiologists to explore multiple career options in industry, government, academia and the nonprofit sector without leaving home. Each section also includes profiles of APS members working in that sector; the profiles describe members' unique career paths and professional contributions.

"The Career Navigator is a great tool to help you understand the robust nature of the field," Harrell says. Members who would like to share their career path can click the "Share Your Job Story" button on the right side of the page to submit their information.

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Pivoting when circumstances change is smart. “Life is too short to remain in a situation that is chronically stressful and unsupportive,” says Ann Schreihofner, PhD, FAPS, professor of physiology and anatomy at the University of North Texas Health Science Center. “Follow a path that you find rewarding.”

Don’t get overly attached to career labels. Instead, seek opportunities to develop. Look for places that have the tools and infrastructure to support your growth and people whose skill sets complement yours.

“My best advice is to avoid categorizing your work into a specific field or inquiry,” Schreihofner says. “Find a creative, supportive and interactive environment. Bring what you know to an environment that will embrace a fresh perspective and allow you to blossom.”

That’s what Pollock did when he accepted a position at UAB. “I wanted to go somewhere where I could translate my research,” he says. He chose UAB, even though the institution didn’t have a physiology department, because they have “a tremendous clinical research unit,” he says. He now works with colleagues across departments.

His willingness to try new things is likely one reason Pollock has had a long, varied and personally satisfying career. Adesina encourages other physiologists to explore and recognize opportunity, even in disappointment.

“Sometimes you’ll fly out to a location to meet with someone, and they’ll need to cancel,” she says. “Don’t just go home. Find out if there’s someone else you can talk to or meet with. Create opportunities for yourself. You owe it to yourself and to the career you want to have.”

APS JOB BOARD

Using the APS Job Board

www.physiology.org/jobs

When John Harrell, PhD, decided to explore career opportunities, he “hit the job boards.” That’s where he noticed the posting that changed his life: an ad for a contract research physiologist to work at Wright-Patterson Air Force Base.

Today, job seekers and employers have access to a multitude of job boards and online search engines. The enhanced and updated APS Job Board is a great starting place for those looking for jobs and those looking for help.

Relaunched in fall 2022, the APS Job Board is now interactive. You can scan the current listings, search by location or keyword, or quickly view the “newest” or “featured” offerings. Job seekers can also upload their resume and set up job alerts, which will automatically email them daily with information about suitable jobs.

“You don’t have to pop on every day to check, even though new positions come in every few days,” says Jennifer Blenkle, APS senior director of strategic initiatives. “An alert will come straight to your mailbox.”

Employers can choose the job posting package that best suits their needs (such as 30 days or 90 days) and search uploaded resumes.

Ann Schreihofner, PhD, FAPS, professor of physiology and anatomy at the University of North Texas Health Science Center, has used the APS Job Board both as a job seeker and an employer. “One of the reasons why I became a member of the American Physiological Society is because the Society is keen to provide opportunities. Access to job boards was so crucial at the beginning of my career; now, I’m able to advertise jobs.”

APS CAREER SHOWCASE

Taking Part in Career Showcase

The Career Showcase debuted at the 2023 American Physiology Summit in April. The Showcase highlighted non-academic careers and offered tips for exploring career opportunities.

In the Exploring Careers Outside of Academia panel, scientists shared their experiences in industry and how they’ve leveraged their scientific knowledge and training to build a successful science career in industry. The Job Search Secrets for Success mini sessions introduced some of the essential considerations for initiating a career search outside academia—identifying your transferable skills, developing a resume and cover letter, and building a network to explore opportunities.

“Think of a live version of the Career Navigator profiles; that was Career Showcase,” says Jennifer Blenkle, APS senior director of strategic initiatives. “We had APS members talking about their careers and experiences as physiologists in industry and government sectors. Attendees learned from scientists working in a startup, from a medical writer and more. We also hosted a career networking event.”



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CRACKING CODE

How physiologists are advancing science in neurodegenerative diseases.

BY DARA CHADWICK

Neurodegenerative diseases have long been a scientific puzzle. What causes these conditions and how can we cure them?

The term includes disorders that cause progressive functional loss and death in neural cells, leading to nervous system dysfunction. Of the more than 600 known neurologic disorders, neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, amyotrophic lateral sclerosis (ALS) and other motor neuron diseases are estimated to affect nearly 7 million people collectively in the U.S.

Meredith Hay, PhD, FAPS, professor of physiology at the University of Arizona in Tucson, spent much of her career studying high blood pressure. About a decade ago, she began to study age-related cognitive impairment and how memory changes as we age.

Hay's research interests came together in a personal way. "My mother suffered from undiagnosed heart failure following chemother-

apy for breast cancer," she says. "She developed significant cognitive impairment and, ultimately, vascular dementia. I knew then that we had to find a way for cardiovascular experts to connect with neuroscientists to help patients."

Hay says about 70% of people older than 65 have hypertension, diabetes or cardiovascular disease. "The question has always been, what's

the impact of those diseases on our cognitive function?" she says.

There's much that researchers don't yet know about neurodegenerative diseases. But we do know that our risk of developing these conditions increases with age. With the Pew Research Center projecting more than 80 million U.S. residents age 65 and older by 2050, we also know that time is of the essence for this work.



FINDING THE COMMON DENOMINATORS

One difficult challenge in neurodegenerative disease research is the vast number of unknowns. Bringing scientists together is key to making progress, Hay says.

“Whether it’s clinical science or basic science, our disciplines are deep, but not broad,” she says. “Rarely does a patient have just one disease, and often one disease will impact another. Getting people to think outside their silos is one of the big challenges in science. It will require multiple disciplines to achieve the breakthroughs we’re looking for.”

In studying vascular dementia, Hay looks at the role of brain inflammation and reactive oxygen generation in neurodegenerative disease development. “Reactive oxygen is one of the early signals of too much inflammation,” she says. “It’s damaging to tissues and causes cytokine release. One of our therapeutic targets is decreasing reactive oxygen in endothelial cells and in the brain, which will decrease some of

“My mother ... developed significant cognitive impairment and, ultimately, vascular dementia. I knew then that we had to find a way for cardiovascular experts to connect with neuroscientists to help patients.”

—Meredith Hay, PhD, FAPS

the brain inflammation that results in cognitive impairment.”

Most neurodegenerative diseases, including Alzheimer’s, Parkinson’s and some Lewy body diseases, have both an inflammatory component and a vascular component, Hay notes.

“Different neurodegenerative diseases come from different etiologies,” she says. “We want to find those common denominators across different diseases, whether that’s inflammation, vascular changes or blood flow changes. There’s not going to be one gene you can tweak to cure the disease because there are so many factors that affect prevalence.”

Common denominators are also a research focus for Ana Takakura, PhD, associate professor in the Department of Pharmacology at the Institute of Biomedical Sciences at the University of São Paulo in Brazil. She explores links between respiration and neurodegenerative disease using an animal model to induce Parkinson’s in mice and rats to study changes in neurons associated with respiratory rhythms.

Takakura has observed a reduction in the number of neurons in the pre-Botzinger complex, the region of the brainstem in mammals that controls inspiration (inhalation). She has also seen a reduction in neurons in the ventral aspect of the brain stem, where central chemosensors help the brain detect increases in carbon dioxide. “If you have an increase in CO₂, neurons send information to increase ventilation and remove excess CO₂ from the body,” she says.

In Parkinson’s disease, neurodegeneration in the substantia nigra—the brain’s dopamine-producing region—is associated with the disease’s classic motor symptoms. While the substantia nigra is not close to brain regions that control respiration, Takakura’s research shows that neural degeneration and breathing are linked, she says.

In her lab, researchers induce neuron death in the substantia nigra and record breathing changes. Rats show observable respiratory changes in about 40 days while mice show changes at about 10 days. “It’s clear that we first have degeneration of the substantia nigra and then we have degeneration of the neurons that control breathing and, consequently, physiological changes,” she says.

In her model and in Parkinson’s disease, there is a decrease in the number of neurons in the substantia nigra. “The question is, can these neurons of the substantia nigra send direct projections to the regions that control breathing?” she says. With fewer neurons, there are fewer projections, so the two regions no longer communicate. “This could be responsible for neurodegeneration in the respiratory regions.”

Respiratory changes in Parkinson’s are usually associated with pneumonia and obstructive sleep apnea, often seen as disease advances. But Takakura sees common denominators between neural degeneration in the substantia nigra and in regions that control respiration happening earlier in the disease’s progression. She’s optimistic that pharmacological intervention can halt respiratory changes.

“We’ve tried pharmacological approaches to reduce oxidative stress and neuroinflammation,” she says. “We start treatment in a phase of our experimental model where we already have degeneration of the substantia nigra, so it’s like Parkinson’s has already started. We already have the physiopathology of the disease. We start our treatment, and it is able to impair the neurodegeneration and respiratory changes.”

Takakura acknowledges that her research is experimental. “It’s not patients,” she says. “We are talking about pharmacological treatments that can have side effects. But usually, people that study neural control of

breathing study physiological states not associated with pathology. People that study Parkinson’s disease study cognitive symptoms or dysautonomia that can appear before classical symptoms. Respiratory changes are interesting because they can be related to the morbidity and mortality of the disease.”

DETERMINING RESEARCH FOCUS

With so many neurodegenerative diseases, how do physiologists decide where to focus their research efforts?

“A part of my job I love is that I get a bird’s-eye view of what’s going on in the field,” says Jonathan Hollander, PhD, program director in the Genes, Environment and Health Branch at the National Institute of Environmental Health Sciences in Research Triangle Park, North Carolina. He manages a research portfolio exploring how environment affects neurological diseases and disorders. While he helps applicants think about their ideas from the early stage through review, “it’s up to the researcher to present why what they’ve proposed to study is important in its potential impact on human health.”

Multiple factors can affect what research is funded by the National Institutes of Health (NIH), including the rigorous peer review process, Hollander says. He also points out that although Congress typically funds NIH programs and operations through annual appropriations, in some instances, Congress can set money aside to study a particular disease, such as Alzheimer’s. “Currently, there is a bypass budget of several million dollars set aside to accelerate Alzheimer’s disease and related dementias research.

“In the context of neurodegenerative disease, we know that the aging population is dramatically going to increase,” he says. “We know the prevalence of neurodegenerative dis-

eases is going to go up. Certainly, that is a driver of a decision for potential targeted funds for a disease area.”

Hollander encourages physiologists to think big when putting together research proposals. Projects with a strong scientific premise in a particular area may be right for “high risk, high reward” applications in which preliminary data aren’t required. This funding differs from traditional R01 grants, where there may be larger amounts of money but preliminary data are expected, he says.

Neurodegenerative disease research has entered an exciting time, according to Hollander. “There is a lot to understand about genetic and nongenetic risk factors in these diseases,” he says. “Think about an area like Parkinson’s disease where there is a long prodromal phase. Before motor symptoms begin, you might have nonmotor symptoms that could happen decades earlier. This may be a critical window of opportunity for the most effective intervention and prevention strategies.”

Hollander also notes growing interest in biomarkers of neurodegenerative disease. “There’s research looking at exosomes and their role as an early indicator of disease,” he says. “Another area I’m excited about is emerging chemicals research. We have a portfolio of investigators looking at things like pesticides, metal exposure and air pollutants and how they might impact health, but there are so many new emerging chemicals that we know so little about. What environmental exposures can be avoided that might prevent or reduce the risk of disease?”

The common denominators between different neurodegenerative diseases—and between neurodegenerative diseases and other health conditions—remain a strong focus.

“In the context of neurodegenerative disease, we know that the aging population is dramatically going to increase. We know the prevalence of neurodegenerative diseases is going to go up. Certainly, that is a driver of a decision for potential targeted funds for a disease area.”

—Jonathan Hollander, PhD

“We think of these as exclusively brain diseases, but there is a growing interest in areas outside the brain that might be affected before we get to brain pathology,” Hollander says. As an example, he cites changes in the gut that could be early indicators of neurodegenerative disease.

EVOLUTIONS IN TREATMENT

Curing neurodegenerative diseases remains elusive. But emerging therapies that treat symptoms provide hope for many people. Dennis Turner, MD, professor of neurosurgery at Duke University in Durham, North Carolina, is a neurosurgeon who treats tremor and Parkinson’s disease with deep brain stimulation (DBS).

During his career, he has seen an evolution in thinking around treatments for Parkinson’s. In the mid-1990s, glia-derived neurotrophic factor (GDNF) looked to be a promising treatment in monkey models of Parkinson’s disease. Also studied were embryonic cell transplants, with preliminary data from two large multi-center randomized trials that looked promising.

“By 2005, the field had cleared because the cell transplant trials were negative and it’s very hard to get embryonic cells,” Turner says. “The initial GDF trials caused side

effects, and by 2015, all the gene therapy trials with GDNF and similar molecules had not worked well. The only thing left of all the ideas from the 1990s is deep brain stimulation. And it works fabulously well in Parkinson’s.”

In Parkinson’s disease, dopamine is missing. “All the attempts like GDF, standard medical treatment we do now and many of the gene therapies were all focused on enhancing dopamine,” he says. DBS doesn’t involve dopamine; instead, it resets the brain’s circuitry so cells no longer need dopamine and patients don’t need medication.

Potential treatments for other neurodegenerative diseases have generated interest, according to Hollander. “In Alzheimer’s disease, several monoclonal antibodies are undergoing clinical trials,” he says. “While there’s been controversy around aducanumab, there are other therapies in development that show promise in trying to reduce beta-amyloid in the brain. There is controversy about whether that ultimately leads to increased cognitive ability. Can we stop the progression by reducing beta-amyloid in the brain with these drugs?”

Minimal cognitive impairment (MCI) is a predecessor to Alzheimer’s disease, and people with MCI have

more plaques than people who are aging normally, Turner says. “Patients with MCI have had enough brain damage that brain metabolism has dropped. Poor metabolism doesn’t cause neurodegenerative disease but can make it worse,” he adds. Starting treatment early in neurodegenerative disease may help keep symptoms from progressing, according to Turner.

That’s a research goal for Hay. She’s the founder, president and CEO of ProNeurogen, a company working to develop a drug to decrease brain inflammation and reactive oxygen and protect the brain from neurodegeneration. “We’ve taken angiotensin-(1-7), a natural anti-inflammatory peptide in our bodies, and added glucose to it,” she says. “Our drug, PNA5, has a better half-life and has brain penetration.”

Hay encourages physiologists to think outside their own expertise. “We forget that it’s all interconnected,” she says. “But I’m optimistic. I think within the next 10 years, we’ll have some treatments that will help our cognitive lifespan match our physical lifespan. That’s what we all want—healthy cognitive function throughout our lifespan.”

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Dr. Dolittle

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APS Members Elected to the Class of 2022 AAAS Fellows

The following APS members have been named to the Fellows of the American Association for the Advancement of Science (AAAS) Class of 2022. Fellows are elected to this lifetime distinction by their peers serving on the AAAS Council and include Nobel laureates and other scientists who have engaged in pioneering research, leadership, teaching or mentoring.



Jan Kitajewski, PhD, director, University of Illinois Cancer Center; Sweeney Professor of Basic Sciences; head, Department of Biophysics, University of Illinois Chicago



Richard M. Watanabe, PhD, professor of population and public health sciences and physiology and neurosciences; associate dean for health and population science programs, University of Southern California Keck School of Medicine



Susan H. Williams, PhD, professor of anatomy, Department of Biomedical Sciences, Ohio University Heritage College of Osteopathic Medicine



Kathy K. Griendling, PhD, R. Wayne Alexander Professor of Medicine; vice chair for research; executive associate dean for faculty affairs and professional development, Emory University, Atlanta



Anthony T. Vella, PhD, senior associate dean of research planning and coordination; professor and Boehringer Ingelheim Chair in Immunology, UCONN Health School of Medicine



Harel Weinstein, DSc, FBPS, FAPS, Maxwell M. Upson Professor of Physiology and Biophysics, Department of Physiology and Biophysics; director, Institute for Computational Biomedicine; chair, Graduate Program in Physiology, Biophysics and Systems Biology, Weill Cornell Medical College of Cornell University, Weill Cornell Medicine, New York

Declan McCole Honored with Trio of Awards

Declan McCole, PhD, professor of biomedical sciences at the University of California (UC), Riverside, is the recipient of three separate awards recognizing his outstanding contributions to the UC Riverside School of Medicine. The awards are the 2022 Research Achievement Award in Biomedical or Basic Science Research, the Distinguished School of Medicine Service Award and the Distinguished UC Systemwide Service Award. McCole researches the role of the inflammatory disease risk gene PTPN2 in regulating intestinal barrier properties. In addition, he was elected as a Fellow of the American Gastroenterological Association. He has been an APS member since 2005.



Jeanie Park Becomes Deputy Associate Chief of Staff for Research

Jeanie Park, MD, associate professor of medicine at Emory University School of




Medicine in Atlanta, has been selected as the inaugural deputy associate chief of staff for research at Atlanta VA Healthcare System. Park's research focuses on sympathetic nervous system regulation in people with high risk of cardiovascular disease. She has been an APS member since 2010.

Kedra Wallace Named Associate Dean of Academic and Faculty Affairs

Kedra Wallace, PhD, has been named associate dean of academic and faculty affairs for the University of Mississippi Medical Center (UMMC) John D. Bower School of Population Health. She earned a master's degree in pharmacology and a PhD in neuroscience from UMMC and researches the relationships between hypertension, environmental factors and mental health among women with reproductive disorders. Wallace has been an APS member since 2010.



Lorraine Ware Receives Prestigious American Thoracic Society Award

Lorraine Ware, MD, Ralph and Lulu Owen Professor of Medicine and director of the Vanderbilt Medical Scholars Program at Vanderbilt University in Nashville, Tennessee, is the 2023 recipient of the American Thoracic Society's (ATS) Elizabeth A. Rich, MD, award. The honor, named in memory of a respected ATS member and mentor, recognizes "an outstanding woman in ATS who has made significant contributions in the fields of pulmonary, critical care and sleep medicine." Ware has been an APS member since 2003. 



MEMBERSHIP

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CENTER FOR PHYSIOLOGY EDUCATION

Core Concepts of Physiology Huddle

Are you an educator seeking to incorporate the core concepts of physiology into your courses or curricula? Make a standing appointment to attend the monthly Center for Physiology Education's huddle. These provide opportunities for educators and education researchers to discuss ideas and

ask questions about implementing the core concepts of physiology into their work.

The next session is scheduled for Friday, May 12, from 4:30 to 5:30 p.m. EDT. Review the schedule of all upcoming huddles at www.physiology.org/cpeevents.

CENTER FOR PHYSIOLOGY EDUCATION

'Get Stuff Done' with Fellow Teachers and Researchers

If you need more time to work on teaching or educational research projects and want to connect with others, join the Center for Physiology Education's "Get Stuff Done" sessions. During these two-hour virtual working blocks, find others working on similar projects, use the time to focus quietly on your own work, or come and go during the session as your schedule allows. The topic for the Tuesday, May 2, session is "Grading and Semester Wrap-Up." It starts at 4 p.m. EDT. Register and reserve your spot at www.physiology.org/cpeevents.

PUBLICATIONS

New Podcasts on COVID-19, Pancreatitis and Other Topics Available for Download

APS Publications has released several new podcasts with the authors of recent journal articles, including:

- "COVID-19 and Cardiac Autonomic Function"—Author Rachel Skow, PhD, and expert Christopher Minson, PhD, discuss the mechanisms associated with increased cardiovascular risk following a COVID-19 infection. Originally published in *American Journal of Physiology-Heart and Circulatory Physiology*.
- "The Cortical Evoked Potential Corresponds with Deep Brain Stimulation Efficacy in Rats"—Warren Grill, PhD, discusses a new potential biomarker that may be useful in identifying changes in motor behavior. Originally published in the *Journal of Neurophysiology*.
- "Human Frailty and its Modulation by Physical Activity"—Paul L. Greenhaff, PhD, and Janet M. Lord, PhD, talk about their research into human frailty, including the mechanistic aspects of frailty, prevention, interventions and the importance of remaining mentally active. Originally published in *Physiological Reviews*.
- "Anxiety and Muscle Sympathetic Nerve Activity"—Jeremy Bigalke, PhD, and Jody Greaney, PhD, discuss their work on the links between anxiety, muscle sympathetic nerve activity and blood pressure. Originally published in *American Journal of Physiology-Heart and Circulatory Physiology*.

Access all APS Publications podcasts at <https://journals.physiology.org/podcasts>. 



DATES & DEADLINES

AWARDS

Solomon A. Berson Distinguished Lectureship of the APS Endocrinology & Metabolism Section (May 8)

Carl Ludwig Distinguished Lecture of the APS Neural Control & Autonomic Regulation Section (May 19)

John F. Perkins Jr. Research Career Enhancement Awards (May 31)

Teaching Career Enhancement Awards (May 31)

Claude Bernard Distinguished Lectureship Award (June 1)

Julius H. Comroe Jr. Distinguished Lectureship of the Respiration Section (June 30)

Ernest H. Starling Distinguished Lecture of the APS Water & Electrolyte Homeostasis Section (July 1)

Henry Pickering Bowditch Award Lectureship (July 1)

Physiology in Perspective: The Walter B. Cannon Award Lecture (July 1)

Local Undergraduate Research Awards in Physiology (Applications accepted on an ongoing, year-round basis)

More details: www.physiology.org/awards



CALLS FOR PAPERS

Cross-journal Call for Papers (June 30, 2023)

- The Physiology of Obesity

American Journal of Physiology-Cell Physiology

- Musculoskeletal Biology and Bioengineering (June 30, 2023)

American Journal of Physiology-Heart and Circulatory Physiology (June 30, 2023)

- Cardiac Fibroblasts
- Exercise, Physical Activity and Cardiovascular Health
- Sarcomere, Cytoskeleton and Mechanobiology Research
- Impact of Aging on the Cardiovascular System
- Excitation-Contraction Coupling, Electrophysiology and Arrhythmias

American Journal of Physiology-Lung Cellular and Molecular Physiology (July 31, 2023)

- Joint Call for Papers with the *Journal of Applied Physiology*: Novel Insights into Preterm Respiratory Physiology: Celebrating the 100th Birthday of Dr. Mildred T. Stahlman

American Journal of Physiology-Regulatory, Integrative and Comparative Physiology (July 31, 2023)

- Visualizing Physiology: Using Novel Microscopy Methods to Investigate the Mechanisms Underlying Physiology and Pathophysiology



American Journal of Physiology-Renal Physiology (May 31, 2023)

- Diabetic Kidney Disease and Metabolic Dysregulation in Kidneys
- Exercise and the Kidney in Health and Disease
- Hypertension Mechanisms and Hypertension Target Organ Damage
- Kidney Disease: Role of Inflammation and Immunity
- Sex Differences in Renal Function, Transport and Hypertension

Journal of Applied Physiology

- Aging and Adaptation to Exercise (June 30, 2023)
- Long-term Recovery from SARS-CoV-2 (COVID-19) (June 30, 2023)
- Physical Activity and the Brain (June 30, 2023)
- Sex Differences in the Response to Exercise Training (June 30, 2023)
- Joint Call for Papers with the *American Journal of Physiology-Lung Cellular and Molecular Physiology*: Novel Insights into Preterm Respiratory Physiology: Celebrating the 100th Birthday of Dr. Mildred T. Stahlman (July 31, 2023)

Physiological Genomics (June 1, 2023)

- Comparative Physiological Genomics
- Integrative Physiology and Translational -Omics of Exercise and Physical Activity
- Omics of Sex Differences

More details: www.journals.physiology.org/calls

WEBINARS

APS-ADI WEBINAR

Peripheral and Cerebral Vascular Responses Following High-intensity Interval Exercise—May 9, 2023

APS DIVERSITY, EQUITY AND INCLUSION WEBINAR SERIES

Mentoring part 2—May 17, 2023

Focusing on Recruitment and Hiring for Faculty—July 18, 2023

APS DISTINGUISHED LECTURESHP WEBINAR SERIES

Bodil M. Schmidt-Nielsen Distinguished Mentor & Scientist Award Lecture, Awardee: David Allison, PhD—May 11, 2023

Hugh Davson Distinguished Lectureship of the APS Cell & Molecular Physiology Section, Awardee: Eric Delpire, PhD, FAPS—May 18, 2023

TECHNOLOGY IN PHYSIOLOGY EDUCATION WEBINAR SERIES

Integrating Lt-based Inquiry into an Existing Anatomy and Physiology Lab Sequence—June 20, 2023

More details: www.physiology.org/webinars



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A Lab as Labor of Love

BY VERNON A. RUFFIN, PHD

When I reflect on my scientific journey, I immediately think of all the shoulders I have stood on to get to this stage in my career. I'm reminded of all the people and pivotal moments that grounded me and shaped my career. Thus far, I'm thriving in this scientific journey because of the countless sacrifices, opportunities and experiences that prepared me. Early on, I recognized as a student from Hartford, Connecticut, a multicultural and socioeconomically diverse city, that I was fortunate growing up in a family of educators. My parents fostered the desire for knowledge and its practical use in our home as one of our core family values.

After attending a private high school, I matriculated to historically Black colleges and universities (HBCUs). I earned my bachelor of science degree from Virginia Union in Richmond, Virginia, and a PhD from Howard University in Washington, D.C. Both HBCUs catapulted me into scientific and theoretical investigations. I always had an affinity for science and mathematics; however, it was only through exposure to STEM diversity programs, such as the Minority Neuroscience Fellowship Program sponsored by the National Institutes of Health, that I was granted access to the field of neuroscience and STEM professional opportunities that are often underrepresented by minorities.

Through collaboration, mentorship and fellowships, I found success and often interacted with diverse groups of people with various skill sets and schools of thought. As a result of these

multiple perspectives and training styles, I acquired further insight to the international view of science and my role as a scientist and educator.

I received excellent training from Albert Einstein Medical University and the University of California, San Diego as a graduate student and from Yale University and Case Western University as a postdoctoral fellow. These training programs have been instrumental in helping to expose me to cutting-edge research, equipment and institutional resources.

However, it was when I returned to my undergraduate institution as a professor that I further recognized the inequity in access to resources, exposure to information and opportunities. These factors impact overall student interest and academic preparedness independent of the rigor of the academic program. Utilizing the combined efforts of two separate National Science Foundation grants, I successfully infused basic laboratory techniques used in my postdoctoral research project into the introductory biology curriculum. As a result of student interest in research and the study of neuroscience, I created the school's first biomedical research neurophysiology laboratory.

Additionally, I became an entrepreneur in 2019 when I created the Ruffin NeuroLab LLC. The Ruffin NeuroLab, which is a minority STEM training program, encourages overall student development and the pursuit of knowledge beyond the classroom setting by strategically complementing course objectives with hands-on application of techniques. The lab uses a novel approach to teach students concepts in the STEM field, train students in laboratory skills and provide mentoring and professional development.

My laboratory embodies more than just a scientific space; it's a labor of love, a love letter to my family and the community that it seeks to serve. The Ruffin NeuroLab LLC is a daily reminder of the sacrifices and opportunities that were given to me along my journey. ☞

Vernon A. Ruffin, PhD, is CEO and principal investigator at the Ruffin NeuroLab LLC (www.ruffinneurolab.com).



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