

THE Physiologist MAGAZINE

MARCH 2023



THE AMERICAN
PHYSIOLOGY SUMMIT
AIMS TO WOW
PHYSIOLOGISTS **24**

PSYCHEDELICS ARE
BEING STUDIED
AS THERAPY FOR
DEPRESSION AND
ADDICTION **30**

HOPE AND HEALING

Dazzling scientific results aren't necessarily meaningful to patients. So, Monica Perez, PT, PhD, vowed to keep working.

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CONTENTS

FEATURES



18



24



30

18

Hope and Healing

Dazzling scientific results aren't, on their own, necessarily meaningful to patients. So, Monica Perez, PT, PhD, vowed to keep working.

BY WYNNE PARRY

24

New Heights for APS

The brand-new American Physiology Summit aims to wow physiologists with sessions and professional development opportunities.

BY GLENN COOK

30

A Trip into the Future?

Once a key ingredient of the 1960s anti-establishment, psychedelics are now being studied as therapy for depression and addiction.

BY STACY KESS

CONTENTS

DEPARTMENTS

THE EDITOR'S DESK

4 Cheers to the Volunteers!

EVOLUTION WITH SCOTT STEEN

8 Committing to the Liberal Arts Path

To learn what it's like for physiologists to teach and conduct research at a liberal arts college, APS Executive Director Scott Steen, CAE, FASAE, spoke to two professors about their experience.

IN REVIEW

10 Academic Success

LAB NOTES

MENTORING Q&A

12 If You Build It

How to set up and manage your first lab.

POLICY IQ

14 APS works with National Academies to update the "Guide for the Care and Use of Laboratory Animals."

UNDER THE MICROSCOPE

16 Rapid Fire Q&A

Annet Kirabo, DVM, explains how she was able to get an education and shares her guilty pleasure and her favorite (and least favorite) parts of her job.



NEWS FROM THE FIELD

38 New APS president-elect and Councilors elected; New editor-in-chief appointed of *Journal of Applied Physiology*; Writing opportunity for APS I Spy Physiology blog.

TRANSPORT

38 Career successes and milestones of APS members.

DATES & DEADLINES

39 Calls for awards and papers and upcoming events and webinars.

THE LAST WORD

40 Science and Cycling: Creating Meaningful Connections

Lacy M. Alexander, PhD, FAPS, stresses the value of close friendships, especially during the U.S. loneliness crisis.

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[physiology.org/groupmembership](https://www.physiology.org/groupmembership).

Cheers to the Volunteers!

BY MEEGHAN DE CAGNA, MSc, CAE



Dear reader:

The past several years has been a whirlwind of building new APS member benefits; creating and launching the Center for Physiology Education (CPE); debuting a new Career Development Center; hosting scientific webinars on obesity, aging, inflammation and cardiovascular physiology; and designing the American Physiology Summit that will be held next month in Long Beach.

All of this is in addition to our “regular” work of publishing journals and championing important issues with our sections, interest groups, committees and task forces. The common thread woven throughout all these initiatives is the sheer number of smart and generous volunteer leaders without whom none of these accomplishments would be possible.

Did you know that more than 500 members contributed to the creation of CPE? Did you know that more than 600 volunteer leaders helped shape and guide the creation of the American Physiology Summit?

Summit work began in 2020, with hours of Zoom calls ever since. These volunteers were inspired by the belief that we would be together again, sharing science and building community. They were guided by the vision that our first stand-alone meeting was simply going to be the largest and greatest physiology meeting in the history of the discipline! And it will be. This past January, hundreds of section volunteer leaders completed the exhaustive work to evaluate every single abstract submitted to the Summit—nearly 2,000 in total.

Each year more than 1,000 volunteers are part of the peer review and editorial process for our esteemed journals. Our volunteers engage

in our science policy initiatives and write for the APS blogs and this magazine. Volunteers plan specialty conferences, evaluate award applications and contribute to our work on diversity, equity and inclusion initiatives. APS is truly a giving community.

Cheers and thank you to all volunteer leaders—job well done! We can’t wait to celebrate you in Long Beach.

OUR FEATURES

In this last magazine issue before the Summit debuts, we have dedicated one of our feature articles to showing how you can make the most of this in-person event. On page 24, we give you a brief look inside the Summit and what to expect. Then, we provide an array of tips on preparing for the Summit, making the most of the offerings on-site and debriefing once you return home. We think this section will help you arrive prepared and excited!

Our cover article this month features physical therapist turned researcher Monica Perez, PT, PhD, who shares how her Arms + Hands Lab at the Shirley Ryan AbilityLab in Chicago is making a real difference in the lives of people with spinal cord injuries. Turn to page 18 for her story.

A game-changer session at the Summit that is sure to be fascinating will dive into the topic of using psychedelics to treat depression and other conditions. On page 30, we give a sneak peek of some of that conversation, as our feature article explores the potential for psychedelics to treat people and the challenges that go along with it.

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.

CAREER RESOURCES



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).

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[physiology.org/CPE](https://www.physiology.org/CPE)

Committing to the Liberal Arts Path

To learn what it's like for physiologists to teach and conduct research at a liberal arts college, APS Executive Director Scott Steen, CAE, FASAE, spoke to two professors about their experience: Scott D. Kirkton, PhD, FAPS, professor in



Scott Steen, CAE, FASAE

the Department of Biological Sciences at Union College in Schenectady, New York, and Heidi Walsh, PhD, associate professor of biology and department chair at Wabash College in Crawfordsville, Indiana. In their wide-ranging conversation, they discussed the advantages and challenges of working at a liberal arts college

and what physiologists should consider before choosing that path. Here's an excerpt of their conversation:

Steen: How would you compare and contrast your experience in a liberal arts environment to being in a major research university or institution?

Walsh: I think the experience feels a bit more holistic. There is a lot more focus on developing you as a leader at a liberal arts college. You're expected to do research; you're expected to teach and get involved in service, where maybe there's less bureaucracy and less people to do different jobs. It's expected as part of our community that people will step up and help support the mission of the college and support the overall liberal arts philosophy that we have here and not just be laser-focused on their niche. We're expected to have our hands

“There’s kind of a spirit of entrepreneurship. If you have something you want to achieve, it’s on you to find a path to make that happen. ... So, there’s a lot of freedom in that, which is really nice.”

—Heidi Walsh, PhD

across the institution, which I don't think was expected as much in R1 settings.

Steen: I'd imagine you both have to teach much more broadly.

Kirkton: I would say that physiology is that really amazing field in biology that connects ecology to cell biology. And when you're in a liberal arts college, you're usually in a biology department, whereas an R1 school might have a department of ecology and evolution, it might have a department of cellular biology, and it might have a department of physiology. I'm biased obviously, but I feel like the physiologists are the glue that holds the department together. We're able to connect with our colleagues both who do subcellular work and do ecological work. So, I think it's really valuable to have a physiologist that's broadly trained and help students and colleagues make these connections back and forth.

I've had the ability to teach other classes like a bio dance class to [general education] students about anatomy and physiology and how that works with dance—I teach it with a dance professor. I think that holistic view of the students is really interesting. I get to go see my students at their sporting events. I get to see them perform in plays. Their science part is a really important part to them, but it's not their whole thing. I found it to be really valuable in terms of helping train the next generation of, not just scientists, but the next generation of people who are scientifically literate.

Steen: There seems to be a real community advantage to being in the liberal arts environment, as well as other advantages.

Walsh: There's kind of a spirit of entrepreneurship. If you have something you want to achieve, it's on you to find a path to make that happen, although there's lots of support in different ways. So, there's a lot of freedom in that, which is really nice. In our department, and I think across the college, we put a lot of trust in our

faculty as far as how they run their courses and their research programs. The disadvantage is you do lack that community from time to time within

your research discipline. I'm the only person that teaches physiology normally and I'm on my own in that respect. But we have a really active APS chapter in Indiana, so that's been a great way for me, and my students as well, to see the discipline in a broader sense.

Kirkton: Most liberal arts colleges aren't being judged on whether you can get external funding. So for tenure, you do get to pursue what you want to study. The trade-off is you have to find projects or themes that aren't going to be scooped by people who have lots of postdocs and grad students. So, it does make the initial science fun—it's like a kid going out and exploring, just asking really interesting questions. The trade-offs are that you have less resources, less start-up; typically, you don't have students that stay for five or six years like a grad student. So, training is a big issue. I've created a model where I pair younger students with older students to build a lab community and increase the training between the students.

Steen: And you tailored your research focus around the environment you're in.

Kirkton: I study insects, which are easy to keep and relatively cheap compared to vertebrates. There's no [Institutional Animal Care and Use Committee] regulations. Students can easily work with them as opposed to having a mouse colony or where the costs would be really large.

Walsh: My lab studies GnRH neurons and their responses at the cellular level to various forms of stress, particularly endoplasmic reticulum stress, in the context of obesity and various diseases that can influence cell signaling.



Scott D. Kirkton, PhD, FAPS



Heidi Walsh, PhD

So, our model is a cell culture model, which probably is a bit more expensive than insect models, but I was fortunate that Wabash already had most of the equipment necessary in order to run a cell culture lab.

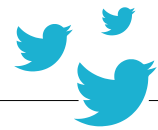
Steen: What kind of advice would you give someone who is at a large research university who might be thinking about a liberal arts college as a career path?

Kirkton: For our school, in order to get tenure you need to be a good teacher, but you also need to be a successful researcher. Ideally, a candidate that would apply for a job at our school would have some teaching experience—it may not be a lot, but something so that we know that they want to do that. And they would also have a successful research program in which they could incorporate undergraduates in terms of the scale of it and the resources they would need

to be successful. Those are important qualities because we can always mentor someone in getting them to be a better teacher.

Walsh: I would say maybe to think more broadly about how colleges and higher education work. Especially at a small liberal arts college, you will be called upon to get involved outside of your department. Even as a department chair, you're kind of the next level of how the college works and how it functions. So, I think having an interest in that and working to support the institution outside of just what you do in your classroom and lab is an important thing. 🐛

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



Physiologists in academia celebrate personal and lab milestones as the new year begins.

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.



Stephanie Franzén
@Steph_PhD

Proud and honored to be a recipient of the [@APSPHysiology](#) 2023 International Early Career Physiologist Award. Looking forward to the [#APS2023](#) Summit ★

3:13 PM · Jan 20, 2023



Caroline Rickards, PhD
@CARickardsPhD

10 Years of the Cerebral & Cardiovascular Physiology Laboratory at the University of North Texas Health Science Center! I am so proud of all the individuals who have contributed to the success of our laboratory - thank you!

[@unthsc](#) [@SBS_UNTHSC](#)



11:24 AM · Jan 5, 2023



Jesse Moreira, PhD, MS
@JDM_Physiology

Update: we are slaying with a title now lol



3:33 PM · Jan 5, 2023



Michael Kaufman
@SciDeanKaufman

How often do undergrads publish with Nobel Prize winners? I don't know, but three of [@DrK_Wilkinson's](#) [@SJSUScience](#) undergrad researchers just did, in the prestigious journal [@ScienceMagazine](#).

6:37 PM · Jan 12, 2023



Katsu Funai
@KatsuFunai

Celebrating noTwitter Alek Peterlin's first first-author paper



7:58 PM · Jan 12, 2023



Valentina Di Santo
@valedisanto

Lauder Lab Family #SICB2023



12:21 AM · Jan 6, 2023



Daria Ilatovskaya
@Renal_Phys

🎉❤️ Tenured at @MCG_AUG @aug_provost. Can't be happier to get this honor in the Dept of Physiology at MCG! Best gift for the upcoming 36th birthday. So grateful to all my mentors and friends for continuous support! Thank you @staruschenko for putting me on path to success.



12:49 PM · Jan 23, 2023



Dr. Rachel Penton (she/her)
@BrilliantAqua

Ready to start my 9th year of teaching undergraduate neuroscience! Syllabi & course sites will be made available to students today & I'll see them in the classrooms on Monday!

9:19 AM · Jan 6, 2023

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LABNOTES

MENTORING Q&A YOUR QUESTIONS ANSWERED
POLICY IQ PHYSIOLOGY ON THE HILL AND IN THE HALLS
RESEARCH FIZZ TOP TRENDING RESEARCH FOR 2022
STATS & FACTS PHYSIOLOGY BY THE NUMBERS
UNDER THE MICROSCOPE OUR MEMBERS, UP CLOSE
PUBLISH WITH POLISH BUILD A BETTER RESEARCH PAPER

STATS & FACTS

#1

Long Beach, California, is ranked first among U.S. cities by *The Washington Post* for having the most “nice weather days”—210 days every year that are sunny without being too hot, too humid or too windy.

The Washington Post

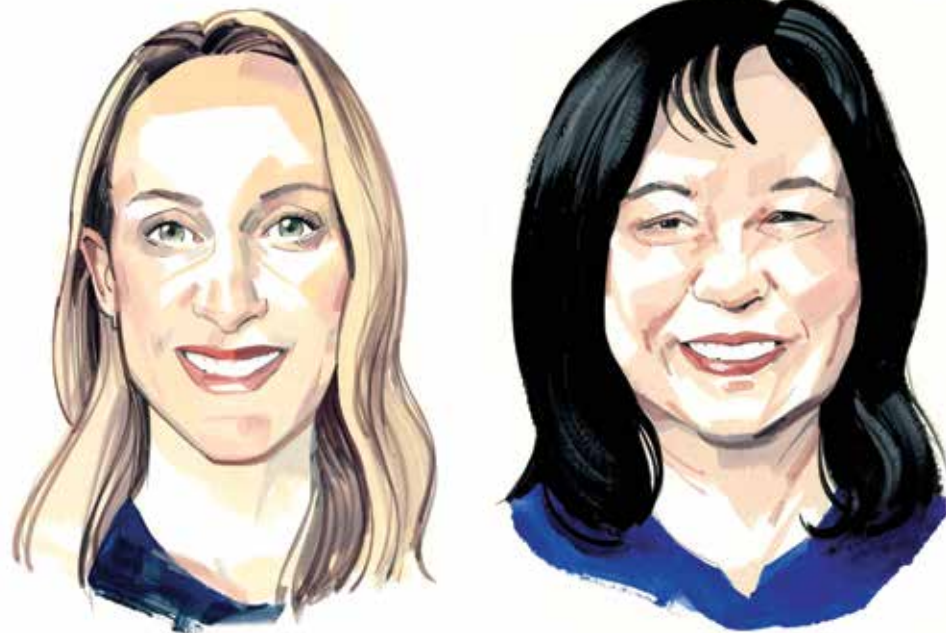
RESEARCH FIZZ



Recent COVID-19 vaccination has minimal effects on the physiological responses to graded exercise in physically active healthy people

This study finds that COVID-19 vaccination does not impair the body’s physiological response to exercise.

Journal of Applied Physiology, February 2022
<https://doi.org/10.1152/jappphysiol.00629.2021>



MENTORING Q&A | EARLY CAREER

If You Build It

How to set up and manage your first lab.

Each issue, we ask a trainee or early-career member to pose their career questions to an established investigator and mentor. Here, Lila Wollman, PT, PhD, assistant research professor at the University of Arizona College of Medicine, asks Catherine Uyehara, PhD, for advice on setting up and managing a lab. Uyehara is director of research at the Defense Health Agency-Hawaii Market and chief of the Department of Clinical Investigation at Tripler Army Medical Center in Hawaii.

Q: What advice do you have for a new principal investigator (PI) trying to set up and manage their own lab for the first time?

A: Physical lab setup: Prioritize what you will need to do your first experiment in your lab. This will help you focus on getting your first set of data, which will help you move forward and feel a great sense

of accomplishment. Don't wait for everything to be perfect before you feel you can start your research. The building or lab room itself may not be exactly what you would want, but make do with what you have and start with making it safe to operate. Not everything needs to be bought and you can adjust your research project to use what is available, or find ways to collaborate, or borrow equipment from colleagues.

Your lab team: Hire a good technician who will be a good teammate. A working relationship where you can trust that your tech will not be afraid to share with you their ideas or let you know what works or does not work is important. Learning from mistakes together builds a great foundation for your research team. Don't ask your team to do work you wouldn't do yourself. Working out a method first yourself so you can explain the special nuances of a procedure is critical to properly training your team to perform. Personally train your technician yourself.

Funding: Pay attention to the details of what it takes to run your lab financially. Understand what you need from core funding support and what budget you will need to adhere to or supplement with grant funds. Figure out how long it takes to procure supplies, services you need so you can properly plan.

Institutional support: Make friends with the folks who you will depend on for support, including maintenance and facilities crews, who can help you get your physical lab set up. Don't be afraid to ask for help and advice from old-timers, colleagues and your supervisory chain, who can share their experiences and give you different perspectives on solving problems.

Q: What do you think are the most important things that you do as a PI to create a supportive environment for your trainees?

A: Be attentive to their needs and ideas. Include them on your decision-making process for the workings of the lab. Don't always tell the trainee what to do, but help by listening to their plan for a solution to a problem and provide feedback. It is important to understand the overall goal of the trainee and timeline to achieve that goal, but it is also important to help the trainee set smaller goals that are achievable to encourage them with little successes more frequently along the way. Put aside time for quality individual time with each trainee to discuss and review what they are working on at least once a week. Once your lab grows, it is good to have team huddles to discuss lab operations and share data once a week.

Don't forget to showcase your trainees' accomplishments whenever you can.

Q: What is your best advice for someone trying to get a tenure-track faculty position? What can make one candidate stand out?

A: When I review candidates for tenured positions, I look for faculty who are able to support the mission of the organization and do so in a variety of ways. Research production, as evidenced by peer recognition through grants, publications and presentations, is expected. Equally important is if what is being researched ties into the overall needs of the institution and how that research translates into the organization's mission advancement. Tenured faculty should be great leaders, showing innovation and great working relationships with colleagues, the lab team and trainees. Leading an important committee or being a training director of a program are ways to show your ability to lead complex teams while providing service. Faculty should have a track record of keeping at the cutting edge of their field of research and also be able to teach basic concepts so each student can succeed. 🎧

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

RESEARCH FIZZ



Evaluating the 35°C wet-bulb temperature adaptability threshold for young, healthy subjects (PSU HEAT Project)

This study finds that healthy young adults may develop heat stress in humid environments at temperatures well below 35 degrees C (95 degrees F).

Journal of Applied Physiology, February 2022

<https://doi.org/10.1152/jappphysiol.00738.2021>

STATS & FACTS

5½ miles

The length of sandy beach that gives Long Beach, California, its name.

Long Beach Area Convention & Visitors Bureau

RESEARCH FIZZ



A multi-trial, retrospective analysis of the antihypertensive effects of high-resistance, low-volume inspiratory muscle strength training

This study shows improvements in high blood pressure by the second week of a six-week course of breathing training.

Journal of Applied Physiology, October 2022

<https://doi.org/10.1152/jappphysiol.00425.2022>

STATS & FACTS

27%

The increase in calls to the Substance Abuse and Mental Health Services Administration's National Helpline in 2020 from 2019.

Substance Abuse and Mental Health Services Administration

RESEARCH FIZZ



Walking or body weight squat 'activity snacks' increase dietary amino acid utilization for myofibrillar protein synthesis during prolonged sitting

This study suggests that periodic "activity snacks" during prolonged periods of sitting may help maintain muscle mass and quality.

Journal of Applied Physiology, September 2022
<https://doi.org/10.1152/jappphysiol.00106.2022>

STATS & FACTS

250,000–500,000

The number of people worldwide who experience a spinal cord injury each year.

World Health Organization



POLICY IQ | ANIMAL RESEARCH

APS Works with National Academies to Update the 'Guide'

APS members and staff met in October with the Institute for Laboratory Animal Research (ILAR) Standing Committee for the Care and Use of Laboratory Animals. During a three-hour listening session, APS members shared their perspectives as physiologists on the committee's plans to update the "Guide for the Care and Use of Laboratory Animals."

Research programs that carry either a public health service (PHS) assurance or AAALAC accreditation are required to adhere to the Guide, a document maintained by the National Academies of Sciences, Engineering and Medicine through the activities of ILAR. Because the document was last updated in 2011, many of the recom-

mendations are out of date, prompting initiation of a revision process. For more background on the Guide, see the May 2022 Policy IQ article "ILAR Initiates Revision of Its Lab Animal Guide" by Sonnet Jonker, PhD, FAPS, and Gaylen Edwards, DVM, PhD.

As a first step toward revision, ILAR is gathering input from stakeholders

who act as sponsors of the standing committee's activities. In April 2022, the APS Council approved a request from the Animal Care and Experimentation (ACE) Committee to serve as a sponsor. Other sponsors of the standing committee's activities include Janssen Pharmaceuticals, the U.S. Department of Health and Human Services, the Department of Veterans Affairs, veterinary groups and the Federation of American Societies for Experimental Biology, among others. As a scientific society representing the interests of working scientists who use the Guide, APS serves as a unique voice in the revision process.

To develop and shape the input offered by APS members, staff convened a group of current and former ACE Committee members to participate in the listening ses-

sion. Committee members and staff worked together in the weeks leading up to the listening session to develop a list of central themes that members felt should be addressed in an updated version of the Guide.

These included a focus on advancing animal welfare while avoiding unnecessary administrative and regulatory burden and a reliance on evidence- and performance-based guidance. (See sidebar for the complete list.) Throughout the listening session, APS members relied on these themes to offer input and answer questions from members of the standing committee.

A second listening session will be scheduled in 2023 to continue the discussion and address new questions about the proposed size and scope of the revised Guide. If you have concerns about the Guide that you would like to share, please contact sciencepolicy@physiology.org.

Central Themes to Address in the Guide Revision

- 1. Facilitate ethical advancement of knowledge**
APS holds that it is the responsibility of ILAR to advance knowledge by facilitating the ethical use of animals in research.
- 2. Focus on animal welfare**
Creating regulatory processes and administrative burden that does not significantly increase animal welfare is counter to the goals of the Guide.
- 3. The reality of the Guide as regulation**
The scientific community experiences the Guide as if it were a regulatory document. It should be written so that it can be clearly interpreted by agencies and accrediting organizations.
- 4. Evidence- and performance-based guidance**
APS encourages the use of performance-based standards, Institutional Animal Care and Use Committee-centered problem-solving, recommendation stratification based on quality and quantity of evidence available, and basis in publicly available evidence.
- 5. Transparency**
It is essential to the scientific community that guidance from ILAR comes from trustworthy voices, that the decision-making processes for the Guide's revision are made clear, that sources of influence are not hidden and that guidance is based on publicly available evidence.

“The opportunity to be involved in the ILAR listening session, surrounded by experienced and established investigators and policy analysts, has been an invaluable experience during my postdoctoral fellowship. In addition to my time with the APS Animal Care and Experimentation Committee, it has completely reframed my perspective on what a scientist should be. We have a large commitment outside of the laboratory to advocacy that is largely ignored, but it is more important now than ever before to protect our biomedical research resources. As trainees, we need to think about this and get involved as early as possible.”

—Eryn Dixon, PhD, a postdoctoral research scholar at Washington University in St. Louis and an APS Animal Care and Experimentation Committee member

RESEARCH FIZZ



Aerobic exercise training reduces cerebrovascular impedance in older adults: a 1-year randomized controlled trial

This study found that a year of aerobic exercise reduced effective resistance to blood flow in the brain blood vessels of older adults.

Journal of Applied Physiology, October 2022
<https://doi.org/10.1152/jappphysiol.00241.2022>

STATS & FACTS

~4–8 weeks

The time it typically takes traditional antidepressants to begin to alleviate symptoms.

National Institute of Mental Health

RESEARCH FIZZ



Effects of regular sauna bathing in conjunction with exercise on cardiovascular function: a multi-arm, randomized controlled trial

This study found that short sauna sessions combined with an exercise routine may improve cardiovascular risk factors more than exercise alone.

American Journal of Physiology-Regulatory, Integrative and Comparative Physiology, September 2022

<https://doi.org/10.1152/ajpregu.00076.2022>

RESEARCH FIZZ



Altered lung physiology in two cohorts after COVID-19 infection as assessed by computed cardiopulmonography

This study used computed cardiopulmonography to study lung physiology in people recovering from COVID-19.

Journal of Applied Physiology, November 2022
<https://doi.org/10.1152/jappphysiol.00436.2022>

STATS & FACTS

31%

The portion of U.S. adults medicated for major depressive disorder who did not respond to the first two antidepressant medications prescribed.

The Journal of Clinical Psychiatry

RESEARCH FIZZ



Impact of breakthrough COVID-19 cases during the omicron wave on vascular health and cardiac autonomic function in young adults

This study found that breakthrough cases of COVID-19 during the 2021 omicron wave did not affect vascular health and cardiac autonomic function in young adults.

American Journal of Physiology-Heart and Circulatory Physiology, July 2022
<https://doi.org/10.1152/ajpheart.00189.2022>



UNDER THE MICROSCOPE

Rapid Fire Q&A

Annet Kirabo, DVM, explains how she was able to get an education and shares her guilty pleasure and her favorite (and least favorite) parts of her job.

Q: Ever had a “eureka” moment?

A: Our manuscript was rejected because the data were driven by outliers. Removing the outliers left us with no story. Out of desperation, we asked a clinical colleague to look at the participants who were “outliers.” Eureka moment: All the outliers had cardiometabolic risk factors for salt-sensitivity of blood pressure, which has been my research focus ever since.

Q: What inspired you to become a scientist?

A: I was born and raised in Uganda, East Africa. I am the first born of nine—three boys

and six girls. My family was considered poor by the poor. Education was not at the forefront of our minds, and boys were given first priority. One of the defining moments in my life is when my dad told us that since there was no money my siblings would drop out of school and start working so I could continue to go to school since I had the most promise. Because we had experienced several premature deaths in the family from lack of health care, I wanted to be a medical doctor. Yet, I had never seen a female doctor. I have been fortunate to have mentors who have empowered me to thrive educationally.

Kirabo and her family attend the General Jackson Showboat show and dinner along the Mississippi River in Nashville, Tennessee.

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

A: Before the pandemic, I think I had settled in a mindset with some sense of entitlement. The pandemic reminded me of my past experiences where tomorrow is not a guarantee and that I needed to use every resource available to make the best of today—and to be thankful for even the most trivial of things—and adopt a growth mindset.

Q: “Old school” technique you’re most proud of mastering?

A: Flow cytometry.

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

A: Flow cytometer.

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

A: Single-cell transcriptomic analysis.

Q: If you were a model organism, which model organism would you be?

A: Human.

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

A: Even when working on cells in cell culture or mice, never lose sight that it is for better health care.

Q: No. 1 guilty pleasure?

A: Dancing to loud Afro music.

Q: Most influential scientist on your career?

A: David Harrison, MD.

Photos, left and facing page, courtesy of Annet Kirabo, DVM

Q: Tell us a surprising fact about you.
A: I love yard sales.

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

A: "24."

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

A: HIV treatment.

Q: Favorite way to spend a free hour?

A: Music/dance.

Q: Most valuable quality in a colleague?

A: Being trustworthy.

Q: Favorite part of your job?

A: Writing papers and grants.

Q: Least favorite part of your job?

A: Busy paperwork.

Q: Notable scientists you follow on Twitter?

A: Paul Welling, MD, @PAWellingMD.

Q: Favorite musician/musical artist/band?

A: Ugandan artists Eddy Kenzo, Bobi Wine and Joy Tendo.

Q: Go-to snacks to get you through long days?

A: Almonds.

Q: Crunchy or creamy?

A: Creamy—ice cream.

Q: City, suburb, country?

A: Country. 🇺🇸

Annet Kirabo, DVM, is a tenured associate professor of medicine in the Division of Clinical Pharmacology at Vanderbilt University Medical Center in Nashville, Tennessee. Research in her laboratory focuses on understanding the interaction between lipid oxidation-mediated protein modification and inflammation in the genesis of hypertension and kidney disease. Kirabo obtained a doctor of veterinary medicine at Makerere University in Uganda, graduating with honors.

Kirabo relaxing with her husband, Christopher Church, and their kids, Jeremiah and Eliana.



Top right: iStockphoto

PUBLISH WITH POLISH | RESEARCH PROMOTION



How to Increase Your Article's Visibility

Promoting your published article maximizes the influence of your research. This column has previously discussed ways APS promotes articles (January 2020 and July 2021), but there are also ways you as an author can actively increase your article's visibility.

The most obvious is to use your existing network of peers and institutions. Emailing article links to your peers, notifying your institution's press office of your article, and referencing your research at conferences are all ways you can generate interest through everyday communications.

Social media is another simple way to get the word out. Sharing links to your article on institutional and academic networking sites (as well as your personal social media) creates an easy way not only of sharing your research but encouraging others to share it as well. Sharing the DOI (digital object identifier) link will ensure a permanent connection to your article into the future.

Finally, be sure to cite your article in future articles you publish—and be sure to update any papers you may be currently writing or are in preprint with links to your published article.

For more ways to promote your APS articles visit <https://journals.physiology.org/author-info.promoting-your-aps-paper-post-publication>. 🇺🇸



HOPE AND HEALING

Dazzling scientific results aren't, on their own, necessarily meaningful to patients. So, Monica Perez, PT, PhD, vowed to keep working.

BY WYNNE PARRY

When trauma or disease damages the spinal cord—that information superhighway embodied by nerves running through the vertebrae—it disrupts communication between brain and body. In most cases, even when someone loses all control of their limbs, the injury doesn't completely sever this neurological conduit. Usually, some nerve fibers survive the insult.

For Monica Perez, PT, PhD, these residual connections are a pathway toward recovery.

Perez is currently the scientific chair of the Arms + Hands Lab at the Shirley Ryan AbilityLab in Chicago. She is also a professor of physical medicine and rehabilitation at Northwestern University and a research scientist at the Edward Hines Jr. VA Hospital, both in Illinois.



Left: Perez with her colleagues, left to right, Linda Jones, PhD; Michael Lane, PhD; and Lana Zholudeva, PhD. Right: Perez with her lab's postdoctoral fellows at the December 2022 holiday party: left to right, Siddharth Gaikwad, PhD; Bing Chen, PhD; and Sina Sangari, PhD. Facing page, top to bottom: Perez works with patient Randy Hall in her lab building. Perez's team sets up patients for a spike-timing-dependent plasticity process, in which stimulation is used to adjust the strength of connections between neurons in the brain.

Fifteen years ago, when she began her first faculty position, Perez set out to activate the residual connections in patients who had lost control of their arms and legs because of injuries to the neck's cervical spine.

Perez believed that by using electrical and magnetic stimulation, she could strengthen them and, ultimately, help patients regain some of the movements they had lost. In those first experiments, she and Karen Bunday, PhD, a postdoc in her lab, adapted a protocol based on what is known as spike-timing-dependent plasticity, in which researchers use stimulation to tune the strength of neurological connections.

In their first experiment, they focused on the upper body, stimulating activity in the part of the brain that controls the hand by placing a magnetic coil against the patients' scalps. They then applied an electrical current to the ulnar nerve, which activates muscles in the hand. They

went on to stimulate both for a total of 100 times, carefully pairing the timing of the ulnar nerve stimulation with that of the brain's motor cortex.

"It was just great," Perez says. "You could see that the size of responses evoked from stimulation of the motor cortex increased or decreased, depending on the timing of the paired pulses, in people who had these injuries for many years."

What's more, after the stimulation, the patients could perform a dexterity task of moving small pegs into holes faster than they could before.

From her perspective, the study was a success, but when she spoke with patients afterward, their reactions suggested a more complicated reality. She remembers showing one man in particular the recordings. "It was difficult for him to connect with the results because he just hadn't seen enough improvement in his ability to use his hand," she says. "It was a moment when the mismatch

between what we'd achieved scientifically and its significance to patients became clear."

She knew: "To really get to the patient, we need to make this better and stronger."

A SWITCH IN CAREERS

A native of Chile, Perez began her career as a physical therapist. Patients with neurological disorders, especially spinal cord injuries, interested her most. She was fascinated by involuntary symptoms such as muscle spasticity and spasms that result from an injury, she says. "I wanted to know 'how do these symptoms arise?' And 'how can we treat them?'"

But over time, she realized that some of the therapies she offered patients lacked a basis in science. And she knew that a better understanding of how the nervous system responds to these injuries could lead to more effective treatments. So, Perez decided to pursue a PhD.





Top: Perez and her husband, neuroscientist Martin Oudega, PhD, have collaborated for several years. Bottom: Perez with her daughter, Emma, and her mom, Adriana.

“Even though I loved working as a physical therapist, I decided that I wanted to be on the other side and contribute in a different way,” she says.

She obtained her doctorate at the Miami Project at the University of Miami Miller School of Medicine, where she learned about approaches that can noninvasively activate these connections. Later, at her postdoctoral positions at the University of Copenhagen and the U.S. National Institute for Neurological Disorders and Stroke, she studied electrophysiology and motor control of arm and leg movement.

In the decade since that first study, in which she noticed the disconnect between her promising results and patients’ reactions, she and her group have optimized the protocol considerably. Now, they target multiple muscles in the upper and lower limbs, using stimulation regimens customized to each patient. Patients receive more paired pulses administered in many sessions, which are followed by physical therapy.

IMPROVING PATIENTS' LIVES

In a major trial that she and her group recently finished, they tested whether or not stimulation for both the arms and legs, along with exercise, can increase the speed of recovery.

After completing 40 sessions, participant Timothy Brodigan, now 21, has seen clear improvement. In 2017, as a teenager, he suffered a traumatic injury in his neck that impaired his ability to walk and use his arms. Like others in the trial, his injury left him severely weakened but with some voluntary control over his movements.

“I definitely feel stronger. I have regained movements in my legs that I did not have before,” he says. “I have participated in many sessions. After three years of intensive rehabilitation, I hit a plateau. That was very

discouraging! The stimulation is definitely helping.”

Roughly a month after starting the trial, Brodigan had improved enough that he felt comfortable walking with a walker with forearm crutches, he says.

Such improvements occur regularly now among patients. “When I discuss the results with them, I don’t need to show them their recordings; they feel stronger and know they have improved in functioning,” Perez says.

She finds the change immensely gratifying: “You feel like you can make an impact, like your scientific efforts are applied and making a difference.”

“You feel like you can make an impact, like your scientific efforts are applied and making a difference.”

FAMILY COLLABORATION

Achieving clear-cut improvements hasn’t dampened Perez’s motivation to understand the mechanisms at work in patients’ nervous systems.

The stimulation could work by increasing communication between

neurons and may encourage cells to sprout and connect with other neurons. To better understand these mechanisms—and how to continue to optimize them—she has partnered with her husband, neuroscientist Martin Oudega, PhD, also at the Shirley Ryan AbilityLab, to study this process in a rat model.

The couple met at the Miami Project when Perez was a graduate student. At first, Oudega’s work on cell transplantation in animal models with spinal cord injury appeared to have little in common with Perez’s interest in human physiology. However, they eventually found common cause in studying methods to encourage plasticity in the nervous system, and the two have collaborated heavily for several years.

While they look to explain why the protocol works, Perez faces another question: How far can it go? “We have a couple of individuals who have completed 120 sessions with us, and we haven’t seen their improvement plateau yet. This is very promising,” she says.

Her group is seeking to introduce its stimulation-based approach to other hospitals and to adapt it to help those with complete paralysis. “Right now, the patients with some voluntary control benefit the most, but we want to help everyone with a spinal cord injury,” she says. “And we want everyone to benefit and get better faster and more efficiently.”



Timothy Brodigan—with his mom, Robyn Yankee-Brodigan—has benefitted from Perez’s efforts to stimulate his arms and legs to improve movement.



FOR NEW HEIGHTS APS

The brand-new American Physiology Summit aims to wow physiologists with sessions and professional development opportunities.

BY GLENN COOK

The first-ever American Physiology Summit, which will be held April 20–23 in Long Beach, California, promises to be the premiere event for researchers exploring the science behind some of the most important questions that impact life and health.

Kirsteen Browning, PhD, chair of the APS Program Working Group, which is responsible for developing the Summit's scientific program, says the meeting will focus on breaking down siloes and encouraging cross-disciplinary science. More than 80 foundational science sessions and eight exclusive game-changer sessions are planned for attendees who work, learn and teach in the biomedical sciences.

How to Build Your Summit Schedule

The prospect of attending a large in-person conference can be intimidating, especially for first-timers, but planning ahead and being flexible on-site can help you make the most of the experience.

Gabrielle Dillon, PhD, a postdoctoral fellow at the Mayo Clinic, says preparing a list of sessions and events you want to attend before the conference starts can prevent you from becoming overwhelmed or stressed. On-site, you should review the next day's schedule each evening and make any tweaks necessary.

"Accept the fact that you are not going to make it to every single event," Dillon says. "Make note of the talks and events that most excite you and plan your daily schedule around those."

Additional Tips:

- Download the APS mobile app to plan your schedule.
- Talk to an adviser/mentor before the conference to get suggestions about sessions and networking events to attend.
- Before the conference starts, identify people you are interested in meeting. Look up their papers and visit their lab websites to have talking points and questions ready when you meet them.
- If more than one person from your department or lab is attending, prepare to divide and conquer. Review your schedules together so you can plan to go to different sessions and share notes.
- Self-care is critical. Be prepared for long days, with early mornings and late nights. Wear comfortable shoes, carry a water bottle and get to bed at a decent hour.



"We want people to come together with an interest across topics and hope you will focus on your own science by looking at it in a new light," says Browning, a professor at Penn State College of Medicine. "We're really looking at the breadth of the science and touching on topics that you may not normally expect at this type of meeting. Hopefully, we can bring physiology to a new audience."

Meeghan De Cagna, MSc, CAE, APS chief community and learning officer, says, "the sheer scope of the science we are covering is incredibly impressive. Our scientific programming team has painstakingly designed content for the most senior and experienced investigators, as well as those just beginning their career."

Each attendee should leave the Summit inspired by their chosen specialty, the discipline of physiology—and feel connected to their new network of peers and mentors, De Cagna says. "So many of our members call APS their scientific home, and that feeling and that loyalty begins at the Summit.

"Working closely with the scientists has been a true labor of love for all of us who have been deeply involved, De Cagna says. "I think our attendees are most excited about the eight game-changer sessions and the PhysioHub." The game changers feature critical topics in science like healthy aging, the effects of long COVID, climate change, engineering cells, science misinformation and more, while the PhysioHub is an innovative space designed to engage attendees and build community."

Kathy Lovato, APS director of scientific meetings and events, says holding the in-person conference is important after years of Zoom meetings due to the pandemic.

continued on page 28

Are Business Cards Still Useful?

Bringing a stack of business cards with you to a large conference may seem outdated in the digital age, but they are still the quickest and simplest way to share your contact information when you're making a first impression in a face-to-face environment.

A business card with your relevant information—name, job title, phone number, email address and website, and ways to connect on social media—is an entry point, a physical reminder of who you are and what you discussed.

Many physical business cards are now printed with QR codes that can be scanned by a smartphone or tablet that sends a person to your website. If you have a card with an NFC (near field communication) microchip, a person can access your website or app simply by placing their device near it.

Speaking of apps, a host of digital business cards can be found in the App Store and Google Play. Adding basic information is generally free,

but you can pay for add-ons such as the ability to embed YouTube videos or attach PDFs and PowerPoint presentations. Many of the apps also allow you to scan a physical business card to digitize the contact's information.



Your Post-Summit Debrief

Whether you're attending the American Physiology Summit solo or as part of a group, be prepared to share what you've learned with your colleagues after the conference ends.

Tracy Baynard, PhD, professor at UMass Boston, says attendees should plan for debriefs with their entire lab group and with their mentors one-on-one following the Summit. Those debriefs will be valuable, especially if you aren't afraid to challenge yourself professionally during and after the conference, she says.

For many attendees, the biggest challenge will be how you communicate with colleagues about what you learned, Baynard says. Start by being prepared for questions, such as:

- Why did a presentation or poster really stick with you?
- What about the presenter's style made it easy to take in or difficult to appreciate or understand?
- What did you learn from the networking sessions?
- Did you visit with exhibitors? Are there new products or services that would be good additions to your lab?

"Many times this professional challenge comes in the form of communicating with our colleagues in one shape or another," Baynard says. "Everyone should have an opportunity to share what they learned, liked, didn't like, and have meaningful conversations. These things will make you a better communicator faster if you pay attention to them."



“We’re really looking at the breadth of the science and touching on topics that you may not normally expect at this type of meeting. Hopefully, we can bring physiology to a new audience.”

—Kirsteen Browning, PhD


Make the Most of PhysioHub

If you are looking for career and professional development that is not directly related to foundational science, the PhysioHub is the place to be in the Long Beach Convention Center.

An innovative space for scientific exchange and networking, the PhysioHub is the “heartbeat of the meeting,” says Kathy Lovato, APS director of scientific meetings and events. Those who visit the hub will find:

- Scientific posters
- Networking lounges
- Industry partners
- A community service project
- Technology product theaters
- Four stages showcasing scientific and career programming, including information on publishing your research

The PhysioHub will also offer a Career Showcase that will focus on nonacademic and nontraditional careers, showing how you can use a physiology degree outside the research and teaching arena. Scientific publishing sessions will focus on the peer review process, ethics, rigor and reproducibility, and promoting your research.



While online learning is great for a one-hour webinar, it's not the same when you're participating in a four-day meeting.

"I think we all have Zoom fatigue and yearn for human connection," Lovato says. "Networking is more fun when you can speak with a researcher directly and engage in their poster rather than view a static image online. Virtual meetings cannot substitute for standing in a coffee line and realizing you and the person in front of you both trained in the same lab. Those magical moments that happen at meetings cannot be replicated in a virtual environment."

Lovato says attendees need to plan and tailor their schedules in advance because sessions at a meeting this large inevitably overlap and there's always the potential for information overload. She also encourages attendees to pre-determine who to engage with during the various networking sessions.

"We're releasing the Summit mobile app on April 3," De Cagna says. "We encourage attendees to spend time in the app, planning your schedule, making appointments, viewing science content, creating your profile and connecting with others. Preparing ahead of time will help you to acclimate easier. When we hit go on April 20 at 4 p.m., we're off the races!"

While APS is putting resources into building a robust mobile app, Lovato hopes attendees will enjoy Long Beach and its many museums and restaurants and vibrant shopping scene, which is within walking distance of the convention center.

"The days can be long, but they are so fulfilling," Lovato says. "You will never regret the decision to invest in your professional development." 📞

“Virtual meetings cannot substitute for standing in a coffee line and realizing you and the person in front of you both trained in the same lab. Those magical moments that happen at meetings cannot be replicated in a virtual environment.”

—Kathy Lovato

How to Overcome the Networking Jitters

Attendees get the most out of professional development conferences when they attend interesting sessions and take part in valuable networking opportunities.

"Networking is really important, especially for trainees, but across all career stages," says Kirsteen Browning, PhD, professor at Penn State College of Medicine. "This may be one of the few opportunities you have to meet the people in the research and science community who are of great relevance to you."

But networking does not come naturally to everyone. "Networking jitters are real and you're not alone," says Tracy Baynard, PhD, professor at UMass Boston. "This is one of the reasons why I so enjoy connecting folks together at conferences. I know how hard it can be but how important it is for one's development."

Some tips to make your networking experience a good one:

Before the Summit

- Identify people you are interested in meeting, do some research on their work and visit their website.
- Prepare a few questions and talking points for when you meet them.
- Practice your introduction.

At the Summit

- Be yourself. Remember: Everyone was in your shoes at some point.
- Attend the networking events, including the morning coffee gatherings, poster receptions and the Trainee Bash.
- Don't be afraid to have fun while remaining professional.
- Connect with others via social media and post before, during and after the conference using the Summit's hashtags (#APS2023, #MeetMeAtTheSummit).



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?

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Check out the catalog today at physiology.org/GraduatePhysiology.



Interested in listing your program?

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A TRIP INTO THE FUTURE?

Once a key ingredient of the 1960s anti-establishment, psychedelics are now being studied as therapy for depression and addiction.

BY STACY KESS

Hallucinogenic drugs were once the darling of mid-20th century counterculture and on the fringe of questionable psychological research. But today, psychedelic compounds range from psilocybin—the key ingredient in “magic mushrooms”—and ibogaine—which is derived from the roots of a tree native to Central Africa—to lab-made compounds such as 5-MeO-DMT (5-methoxy-N,N-dimethyltryptamine). Psychedelics are now being tested for their therapeutic effects on everything from drug addiction to depression. Furthermore, a few U.S. states are beginning to legalize psilocybin for adults.

“We are witnessing a shift away from propaganda that was shared regarding psychedelics in the ’60s and ’70s,” says Frederick Barrett, PhD, a cognitive neuroscientist and acting director of the Johns Hopkins Center for Psychedelic and Consciousness Research in Baltimore. “We are also exploring models for the therapeutic use of psychedelic drugs, and these may become available as a treatment for both mood and substance use disorders, if not for more indications.”

“One of the mechanisms for psychedelics is increasing synaptic plasticity, making it easier for neurons to make new connections. This plasticity occurs rapidly, which may be related to how quickly patients respond to treatment.”

—Olusola Ajilore, MD, PhD

In recent years, research around psychedelic compounds and their usefulness in neuropsychiatry has been ramping up at universities, hospitals and clinics across the U.S. and around the world. In the U.S., some of that research has been driven by patients, says Nolan Williams, MD, director of the Brain Stimulation Laboratory and of the Interventional Psychiatry Clinical Research Department of Psychiatry and Behavioral Science at Stanford University in Stanford, California.

Williams was approached anonymously by a program working with veterans four years ago to evaluate signals of efficacy and safety of ibogaine. “There have been a number of special forces veterans who have gone to Mexico, where this is legal, who took it and had dramatic improvements,” he says. “These folks feel like there’s a lot of benefit [for post-traumatic stress disorder, traumatic brain injury and suicidal ideation]. We have been performing rigorous evaluations of the effects of ibogaine prior to and after administration” via functional magnetic resonance imaging, electroencephalogram and psychological and neurocognitive evaluations.

Williams is not new to the world of mind-altering drugs. He previously worked on the human therapeutic mechanisms of ketamine and says he is agnostic to the nature of the therapy.

“We want to understand how all this works,” he adds. “I’m trying to understand what’s going on in the brain when [psychedelic effects happen]. If you understand what’s going on in the brain, then you can emulate it or get to the end goals. Once you understand how something works, you can extend it out.”

Although the results of his research are still in the early stages and will not be ready to share for

a year or more, he said he remains pragmatic about the use of psychedelics: “I try not to bias myself.”

For psychiatrists such as Olusola Ajilore, MD, PhD, who directs the Mood and Anxiety Disorders Program and is the director of Clinical Research Core/Center for Clinical and Translation Science at University of Illinois at Chicago, there is much promise in psychedelics. “There has been a lot of excitement and hype around the clinical benefits of psychedelics,” he says.

That’s why he’s collaborating with researchers studying the actions of psychedelics at the cellular level and working with a resident on a project examining the knowledge, attitudes and beliefs about psychedelics for therapeutic uses in a diverse patient population.

“One of the mechanisms for psychedelics is increasing synaptic plasticity, making it easier for neurons to make new connections,” he says. “This plasticity occurs rapidly, which may be related to how quickly patients respond to treatment. This is different from current antidepressants, which take four to six weeks to work.”

Barrett, who is working with psilocybin in patients with comorbid depression and alcohol addiction disorders, said there are still “many questions, including how often people may need to repeat psychedelic interventions, how dosing and frequency of intervention may differ and be optimized for different indications, and whether there are some populations (such as those suffering from mania) for whom it is clearly contraindicated,” he says. “Psychedelics are powerful drugs, and we still have a lot to learn about the safe administration of these compounds, but the science is progressing at pace, and we hope to soon have more traction in these areas.”

HOW DO PSYCHEDELICS WORK?

Exactly what happens in the brain when a patient takes psychedelics is still unclear—and that’s what Sharmin Ghaznavi, MD, PhD, director of cognitive neuroscience and associate director of the Center for Neuroscience of Psychedelics at Massachusetts General Hospital in Boston, hopes to answer. The Harvard Medical School psychiatrist says she did not set out to study psilocybin; she started out looking for treatments to relieve rumination in patients.

Her colleague returned from a conference that included a presentation on psilocybin’s effects on the brain and shared what he had learned, leading her to read more about psilocybin and design a study to look at its effects on rumination.

Now, after two years spent obtaining the necessary regulatory and institutional approvals, she has started recruitment for what will be a first-of-its-kind study.

“The interesting thing is that because these studies are so difficult to do, there actually aren’t that many studies of neuroimaging in patients treated with psychedelics. In fact, there are many papers in the literature that are based on just a few data sets,” Ghaznavi says.

Additionally, nearly all neuroimaging studies of psychedelic compounds in patients so far are in the resting state, in which the data are collected while patients are resting with their eyes open, or in some cases closed, but not engaging in tasks. “All the data is very preliminary—and it has generated very good questions, but there is a lot we still don’t know.”

Ghaznavi’s study will image patients at baseline, then administer the dose of psilocybin and take a scan the day of administration—scanning in both a resting state and while the subject is doing a task—then at three weeks and

again at 12 weeks to see how neural networks are affected.

“We’re going to be the first study that I know of to image patients on psilocybin on the day of administration,” she says. “It’s a missing piece of the puzzle because the activity that’s going on that day is going to tell us a lot about how these compounds work.”

THE MICRODOSING APPROACH

While professional research is ramping up, so is popular acceptance. Colorado voters passed a ballot measure in 2022 to allow psilocybin to be used therapeutically, and Oregon will allow some state-regulated dispensaries to distribute psilocybin for therapeutic use beginning this year.

Meanwhile, “microdosing”—the use of small doses that users self-report are too small to cause a full psychedelic effect—made news in daily media such as *The Washington Post* and NPR in 2022.

“I think there’s a tremendous need for better treatments—better-tolerated treatments—so I think people are rushing for what they see as the answer,” Ghaznavi says. “But as a psychiatrist, operating on the principle of first do no harm, I want to see the evidence before recommending use.”

Williams notes that microdosing could be a placebo effect as the evidence that such a small dose in the scant research done so far is unclear. In a November 2022 *New England Journal of Medicine* study of 79 people, a 1 mg dose of psilocybin was not effective. But there also didn’t seem to be as much risk with the dose, he notes. “There is likely a psychedelic dose threshold that becomes therapeutic, and we do not know what that is, and it is likely different for different individuals.”

That study, which compared 1 mg with 10 and 25 mg single-dose psilocybin treatment’s effect (with psycho-

logical support) on depression at one, three and 12 weeks, showed results at higher doses. But, it also showed side effects of nausea, vomiting and dizziness in more than half of participants, and all participants experienced suicidal ideation and self-harm.

“What are the real harms and what are the real risks?” Williams continues. “It’s unclear to me if microdosing is a risk or not because there hasn’t been a great trial performed yet. Psychedelics at the currently described microdosing doses may be homeopathy for some and therapeutic for others. ... It’s curious. We don’t yet know. We don’t definitively know that any of the classic psychedelics are actual treatments yet, and determining that is the role of the FDA, not individual investigators.”

Barrett agrees: “The current research literature has not provided any empirical evidence to support claims that have been made regarding microdosing,” he says. “All controlled studies to date have been completed in healthy individuals, and none have been published in any patient population. It may be that the studies to date have not employed the most appropriate study design, or engaged the right populations, or included the most appropriate outcome measures, but that should not minimize the fact that no controlled studies have provided data supporting any benefit (often, any effect at all) of microdosing.”

THE IMPORTANCE OF A THERAPEUTIC SETTING

For psychedelic therapeutic use, these experts emphasized that use within the therapeutic setting is important. “Not unlike every other kind of therapy, the alliance with your therapist matters,” Ghaznavi says. “The alliance between patient and therapist, during times of distress, is part of what helps people get through.”

Psychedelics Experts to Present at American Physiology Summit

Learn about therapeutic strategies involving the use of psychedelic substances to treat depression at the 2023 American Physiology Summit, which will be held April 20–23 in Long Beach, California.

The game-changer session “Rewiring the Brain to Treat Depression: Psychedelics and Novel Therapies” will feature Frederick Barrett, PhD, of Johns Hopkins University; Nolan Williams, MD, PhD, of Stanford University; and Olusola Ajilore, MD, PhD, of University of Illinois at Chicago.

It is one of several game-changer sessions, which will feature some of the biggest topics impacting life and health today. Learn more and register for the Summit at www.physiology.org/APS2023.

Williams says if there was a possibility of therapeutic drugs being derived from the current research it is years down the road, adding that one of the most important parts of therapeutic psychedelic use is “set and setting.”

“You have to have the therapeutic environment controlled during these psychedelic sessions,” he says.

Barrett explains that the setting can make all the difference. “Under supportive conditions and in properly screened individuals, one or two doses of a classic [serotonergic] psychedelic drug seems to have the capacity to substantially reduce depression severity or lead people to remission,” he says. “One to three doses of a classic psychedelic under similar conditions also seem to have the capacity to support rapid and sustained behavior change in the form of abstinence from cigarettes and reduction in unsafe drinking habits.

“Psychedelics have also been shown to be safe in properly screened healthy individuals,” Barrett continues, “with the majority of study participants indicating that their experience with a high dose of psilocybin in the laboratory was among the top five or single most personally meaningful and spiritually significant experiences of their entire lives.”

He adds that he does not see a future where therapeutic psychedelic use will ever be outside the treatment setting.

PSYCHEDELIC ACCESS AND NEXT STEPS

What’s next for psychedelic research? Ajilore says he hopes for an expansion of research and the number of studied psychedelic substances.

“I would like to see well-conducted clinical trials of psychedelics involving more diverse participants that may have not had prior positive experiences with psychedelics,” he says. “I think this would make the clinical use of these agents more generalizable.”

Williams says research into a range of psychedelic substances matter, especially when substances such as ibogaine and psilocybin have extended periods of psychoactive effects—with long periods of onset and taking hours to wear off—while substances such as DMT/5MeO-DMT have much faster psychoactive effects. The problem, he notes, are that all of these substances are tightly controlled by the U.S. government as Schedule I substances; the exception is the most studied rapid-acting psychomimetic substance, ketamine, a Schedule III drug, which Ghaznavi notes is not a classic psychedelic drug.

To work with these drugs in the lab, researchers must apply to the U.S. government under strict regulations, which can take years, and procure synthetic or semi-synthetic versions of the drugs from only a couple of tightly controlled labs that produce the compounds. The regulations of working with Schedule 1 compounds continue, Ghaznavi explains, as researchers then need to report their findings to the U.S. Food and Drug Administration.

“Barriers to the use of natural products include both characterization and standardization of dose within and between different batches of natural products, difficulty in maintaining purity of natural products, unknown influence of the hundreds of additional compounds that can be present in varying concentrations in natural products, and characterizing and maintaining the stability of compounds in natural products,” Barrett says.

For researchers, says Williams—whose subjects used a semi-synthetic ibogaine from a lab in Mexico—the tight control on these drugs can delay or deter studies and make it difficult to get these drugs in the hands of scientists.

“There is a scientific need for psychedelics to be rescheduled lower than Schedule 1. If these substances prove to be efficacious in rigorous clinical trials, the responsibility to administer them should be placed back into the hands of clinicians. But it’s going to take some time to get there,” he says.

Then, Williams says, more research will be possible in a wider variety of substances on a wider variety of patients.

Williams’ next steps with ibogaine? “If therapeutic efficacy is clear in the next planned randomized trials, along with a cardiac safe way to administer [ibogaine], we may be able to see it as a therapeutic option,” he says. ☞

Trainees, Make the Most of Your Summit Experience

Planning for a large world-class conference like the American Physiology Summit (#APS2023), can be overwhelming, but it can be instrumental in your professional growth. Your participation is vital to the future of the discipline, and we want you to get the most from your experience. That's why we developed programming just for you. Add these student- and trainee-focused events to your schedule.

April 20, 2023

Trainee Bash, 7–9 p.m. PDT, *pre-purchased tickets are required.*

April 23, 2023

Undergraduate Poster Session, 7–9 a.m. PDT

Trainee Advisory Committee Sessions

How to Develop Your Research Program and Lead Your Lab Team to Success, 3–4:30 p.m. PDT

Harnessing Science Communication to Improve Your Career, 3–5:30 p.m. PDT

My Health, My Wealth: How to Survive and Manage Challenges as an Early-career Scientist, 3–5:30 p.m. PDT

Negative Data and Wrong Hypotheses: Turning Lemons Into Lemonade, 3–5:30 p.m. PDT

Explore the schedule at a glance at [physiology.org/APS2023/Schedule](https://www.physiology.org/APS2023/Schedule) to start planning your Summit experience today.

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April 20, 2023



Bettering the Fundamental Understanding of Action Potential and Neural Stimulation

History of Physiology Lecture

12:30–1:30 p.m. PDT *James Lee, PhD, Old Dominion University*



Lecture Title TBD

2023 Annual Marion J. Siegman Lectureship Award

1–2:30 p.m. PDT *Mark Nelson, PhD, University of Vermont*

April 21, 2023



Accumulation of Spurious Transcripts Is a Conserved Hallmark and Detrimental to the Heart

Robert M. Berne Distinguished Lectureship

10:30 a.m.–12 p.m. PDT *Jiang Chang, MD, PhD, FAPS, Texas A&M University*



A Winding Road to Pathophysiology May Get You There Late, But You'll Never Be Bored

Horace W. Davenport Distinguished Lectureship

10:30 a.m.–12 p.m. PDT *James Goldenring, MD, PhD, AGAF, Vanderbilt University*



Sympathetic Neuroimmunity in Obesity

Carl Ludwig Distinguished Lectureship

10:30 a.m.–12 p.m. PDT *Ana Domingos, PhD, University of Oxford*



Digesting Snakes Are a Feast for Integrative Physiology

August Krogh Distinguished Lectureship

1:30–3 p.m. PDT *Tobias Wang, PhD, Aarhus University*



Do T Cells Underlie Sex Differences in Blood Pressure Control?

Ernest H. Starling Distinguished Lectureship

1:30–3 p.m. PDT *Jennifer Case Sullivan, PhD, Augusta University*



Translational Study of Metabolic Dysregulation Associated with Alcohol Drinking: A Risk Factor for Comorbidities in Persons Living with HIV

Solomon A. Berson Distinguished Lectureship

3:30–5 p.m. PDT *Patricia E. Molina, MD, PhD, FAPS, Louisiana State University Health Sciences Center*



Recovery of Filtered Proteins Along the Kidney Proximal Tubule

Carl W. Gottschalk Distinguished Lectureship

3:30–5 p.m. PDT *Ora Anna Weisz, PhD, FAPS, University of Pittsburgh*

April 22, 2023



Limits of Human Performance: Fatigability in the Real World

Edward F. Adolph Distinguished Lectureship

10:30 a.m.–12 p.m. PDT *Sandra Hunter, PhD, Marquette University*



Neurotransmitter Transporters: An Unexpected Journey in Flux

Joseph Erlanger Distinguished Lectureship

3:30–5 p.m. PDT *Susan G. Amara, PhD, National Institutes of Health*



The Respiratory CPG: Fulfilling Dual Roles in Homeostatic and Motor Control

Julius H. Comroe Jr. Distinguished Lectureship

3:30–5 p.m. PDT *Gregory D. Funk, PhD, University of Alberta*



Evaluation: The Key to Successful Programs

Claude Bernard Distinguished Lectureship

8:15–9 p.m. PDT *Marsha Matyas, PhD, Evaluation for Excellence*

May 11, 2023 (To be held virtually)



The Secret Sauce of Mentoring Is Not So Secret: The Key Ingredients Are Caring and Treating Each Person as a Unique Individual

Bodil M. Schmidt-Nielsen Distinguished Mentor and Scientist Award

11:30 a.m.–1 p.m. PDT *David Allison, PhD, Indiana University*



May 18, 2023 (To be held virtually)

Disruption of Carrier-mediated Symport of Ions—Disease Models and Mechanisms

Hugh Davson Distinguished Lectureship

10–11 a.m. PDT *Eric Delpire, PhD, FAPS, Vanderbilt University*

Check out our lineup of speakers, and see why you can't miss the inaugural APS Summit.

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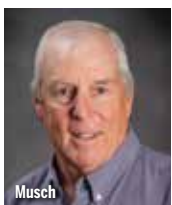
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APS ELECTIONS

APS President-elect, Three Councilors Elected

The results of the APS 2023–2024 elections are in. The following winners will begin their terms in April at the conclusion of the American Physiology Summit.

PRESIDENT-ELECT



Timothy Musch, PhD, FAPS
University Distinguished Professor and Director, Cardiorespiratory Exercise Lab, Kansas State University

COUNCILORS



Michael Caplan, MD, PhD, FAPS
C.H.H. Long Professor of Cellular and Molecular Physiology and Chair, Cellular and Molecular Physiology, Yale School of Medicine



Karla Haack, PhD
Associate Medical Writer, Merck



Gina Yosten, PhD
Associate Professor of Pharmacological and Physiological Sciences, Saint Louis University

NEW EDITOR

New Editor-in-Chief Appointed of *Journal of Applied Physiology*



Lacy M. Alexander, PhD, FACSM, FAPS, has been appointed the next editor-in-chief of the *Journal of Applied Physiology*. She will succeed Sue Bodine, PhD, FAPS, whose term ends July 2023. Alexander is a professor of kinesiology at The Pennsylvania State University.

VOLUNTEER OPPORTUNITY

Love Science Communication? Write for I Spy Physiology Blog!

If you enjoy writing about your science for a lay audience, consider volunteering to write for APS' award-winning blog, I Spy Physiology. Member



Limberg Receives American Autonomic Society Award

Jacqueline Limberg, PhD, is the 2022 recipient of the American Autonomic



Society's (AAS) Felicia Axelrod Award. This honor, named after the founding member of AAS, recognizes an outstanding scientist

at the assistant professor level who has made significant contributions to the field of autonomic science. Limberg's research interests primarily focus on the autonomic nervous system's role in cardiovascular responses to environmental stress. She has been a member of APS since 2012.

contributors are welcome to write about their research, physiology in the news and basic physiological concepts to help others learn more about physiology. Email communications@physiology.org for details. 📧



AWARDS



**Environmental & Exercise Physiology Section
Edward F. Adolph Distinguished Lectureship**
(March 1)

**Environmental & Exercise Physiology Section
Honor Award** (March 1)

Environmental & Exercise Physiology Section Impact Award
(March 1)

**Hugh Davson Distinguished Lectureship of the APS Cell &
Molecular Physiology Section** (March 15)

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

**Preparing Effective Physiology Educators (PrEP-E), an APS
Professional Skills Training course** (April 15)

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

Teaching Career Enhancement Awards (May 31)

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

More details: www.physiology.org/awards

MEETINGS & EVENTS



American Physiology Summit 2023

Conference dates: April 20–23, 2023

Long Beach, California

- Regular registration deadline: March 31, 2023
- On-site registration rates apply: April 1–23, 2023

More details: www.physiology.org/APS2023

CALLS FOR PAPERS



American Journal of Physiology-Cell Physiology

- The Extracellular Matrix and Its Derived Effector Molecules in Aging: Regulators and Therapeutic Targets (April 1, 2023)
- Cellular and Molecular Effects of Antidiabetics Beyond Glycemic Control (May 1, 2023)
- Decoding Fibrosis (May 1, 2023)

American Journal of Physiology-Endocrinology and Metabolism
(April 30, 2023)

- Immunometabolism
- Neural Controls of Metabolism

**American Journal of Physiology-Gastrointestinal and Liver
Physiology** (March 1, 2023)

- Adaptations of Physiological Systems to Promote Cancers
- Coronavirus Disease (COVID-19) and the Digestive System
- Inter-organ Communication in Homeostasis and Disease
- Microbiome-based Therapeutics and Their Physiological Effects

**American Journal of Physiology-Heart and Circulatory
Physiology** (May 1, 2023)

- Cardiac Fibroblasts
- Exercise, Physical Activity and Cardiovascular Health
- Sarcomere, Cytoskeleton and Mechanobiology Research

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 (March 1, 2023)

- Physical Activity, Mitochondria and Disease

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

WEBINARS



**Physiology & Pathophysiology 2023
Symposium, hosted by APS and the
Academia Europaea Cardiff Knowledge Hub**
March 7–8, 2023

More details: www.physiology.org/webinars

Science and Cycling: Creating Meaningful Connections

BY LACY M. ALEXANDER, PHD, FAPS

As we prepare to gather for the first American Physiology Summit, I am reflecting on my own experience of scientific meetings, the exciting prospects of uniting with colleagues and especially the value of the friendships that have evolved through science.

I attended my first APS meeting in San Diego in 2004. As a first-year doctoral trainee, I diligently prepared my three-minute presentation, anticipated every possible question about my data and even looked up pictures of the big names who might walk by my poster (my mentor trained me well). I was particularly excited to interact with two of these scientists; I will call them N2. I held these two people in very high esteem for their contributions to physiology, and they just seemed like fun people! Little did I know at the time how much enrichment they would bring to my life, both in and out of science.

After San Diego I continued to interact with N2 at scientific meetings. They were role models to me, and I wanted to emerge from my professional training to be like them. But I found I had much more than physiology in common with N2. While I am confident that my career has benefited by my professional relationship with them, they have also contributed to my

happiness in other immeasurable ways. N2 were a pillar of support through my most challenging personal moments, including divorce and surgery. They provided the shoulder to cry on, advice

(including how I should go about changing my professional name back to Alexander) and even their home when I needed a place to convalesce.

Having friends and fulfilling interpersonal relationships is the most important predictor of happiness and satisfaction in life. Social psychology studies indicate that we are in a loneliness crisis that predates the pandemic. In 2021, approximately 12% of people in the U.S. reported that they had no close friends; this was an increase from 3% in 1990.

While the cause of our loneliness crisis is multifactorial, one contributing factor is the challenge of making new friends in adulthood.

It is not surprising that time spent together and engaging in leisure activities is associated with close friendships. By the nature of our training as physiologists, we spend concentrated periods of time with people who have common interests. My graduate school lab mates and I spent hours each week helping each other with experiments and engaging in social activities. You would probably find us at a pub or having a BBQ on any given Friday. Now, as I get

older, it takes a concerted effort to put myself out there to make and keep friends.

Intentionality is the cornerstone for building friendship. N2 and I have monthly Zoom happy hours, which are reminiscent of those graduate student Friday happy hours—but with higher quality beverages. We share our adventures in science and in life, and we try to exercise together virtually for 30 minutes once a week. You can catch us doing a Peloton ride most Mondays at 7 a.m. Though we are each in our own home fitness studio, it is the intentionality of spending time together, cheering each other on, laughing and sweating together that makes it feel like we are much closer than across state lines. 🚴

Lacy M. Alexander, PhD, FAPS, is a professor of kinesiology at The Pennsylvania State University. You can find her on Peloton at @LMA_ooo.



Having friends and fulfilling interpersonal relationships is the most important predictor of happiness and satisfaction in life.

Read the comparative physiology blog

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