

# THE PHYSIOLOGIST



A Publication of the American Physiological Society

Volume 38, Number 6

December 1995

## Partnerships for Science Education

M.R.C. Greenwood  
Department of Graduate Studies  
University of California, Davis

*This article is based on a speech delivered to the Office of Science and Technology Policy Forum, Washington, DC, July 26, 1995*

It is always interesting to speculate about what kids know and think about science. A while back someone gave me a list of things kids were reported to have said. For example,

- One horsepower is the amount of energy it takes to drag a horse 500 feet in one second.
- Most books say our sun is a star. But it still knows how to change back into a sun in daytime.
- Cyanide is so poisonous that one drop of it on a dog's tongue will kill the strongest man.

From November, 1993 to May, 1995 I had the pleasure of serving as the Associate Director for Science at the White House Office of Science and Technology Policy (OSTP). During my tenure in the Clinton White House, I strongly supported the Partnerships for Science Education forum. This forum arose, in part, from the coordinated effort to strengthen science and science education as articulated in President Clinton's and Vice President Gore's science policy statement *Science in the National Interest*.

The National Science and Technology Committee on Fundamental Science, which sponsors the forum, also guided that science policy. *Science In the National Interest* provides an important articulation to the American people of why the government must continue to invest in scientific discovery, in scientific leaders, in science education, and in developing a scientifically literate public.

### Is the Public Interested?

Many statements from a variety of organizations and from previous administrations have stressed the importance to the nation of investing in research. Others have stressed the importance of education to our future. Few, if any, have clearly demonstrated a connection between the importance of science education, science literacy, research, and our economic security.

*Science in the National Interest* is not an esoteric document. Rather, it is about people and investing in ideas and education in order to create our collective future.

*Science In the National Interest* has five main goals. The first three are to maintain leadership across the frontiers of scientific knowledge, to enhance connections between fundamental research and national goals, and to stimulate partnerships that promote investments in fundamental science and engineering. These goals are primarily directed toward creating the knowledge base and the new tools that will shape the 21st century economy. The last two goals are to produce the finest scientists and engineers for the 21st century and to raise the scientific and technological literacy of all Americans. These latter goals, although more challenging, are by far the most critical in the long run.

Failure to achieve these latter goals will undermine our ability to achieve the first three and will ultimately undermine the tax base, reduce the ability of this nation to create wealth, and

(continued on page 270)

### INSIDE

Don't Bar The Door...Let Them In	267
Science Teacher Summer Research Program	268
Physiology InFocus	269
Introducing... Peter L. Strick	288

# CONTENTS

<b>Partnerships for Science Education</b>	<b>265</b>	<b>House Endorses "Scientific Opportunities" for Funding</b>	<b>286</b>
<i>M.R.C. Greenwood</i>		<b>Physiology Leads in Medical School Animal Labs</b>	<b>287</b>
<b>A MATTER OF OPINION</b>		<b>NIH Budget Outcome Remains Uncertain</b>	<b>287</b>
<b>Don't Bar The Door...Let Them In</b>	<b>267</b>		
<i>Richard L. Malvin</i>		<b>PEOPLE AND PLACES</b>	
<b>PHYSIOLOGY INFOCUS</b>	<b>269</b>	<b>Introducing...Peter L. Strick</b>	<b>288</b>
<b>MEMBERSHIP</b>		<b>Ganong Receives Lifetime Achievement Award</b>	<b>288</b>
<b>Newly Elected Members</b>	<b>273</b>	<b>APS Members Elected to the Institute of Medicine</b>	<b>289</b>
<b>APS NEWS</b>			
<b>Bylaw Change Proposed by Council</b>	<b>279</b>	<b>NEWS FROM SENIOR PHYSIOLOGISTS</b>	<b>292</b>
<b>MEETINGS AND CONFERENCES</b>		<b>POSITIONS AVAILABLE</b>	<b>293</b>
<b>Neural Control of Breathing: Molecular to Organismal Perspectives</b>	<b>280</b>	<b>BOOKS RECEIVED</b>	<b>294</b>
<b>pHysiology of Acid-Base Regulation: From Molecules to Humans</b>	<b>281</b>	<b>BOOK REVIEWS</b>	<b>294</b>
<b>The Integrative Biology of Exercise</b>	<b>282</b>	<b>ANNOUNCEMENTS</b>	<b>299</b>
<b>Experimental Biology '96</b>	<b>284</b>	<b>SCIENTIFIC MEETINGS AND CONGRESSES</b>	<b>300</b>
<b>PUBLIC AFFAIRS</b>			
<b>APS Urges Air France to Continue Shipping Primates</b>	<b>286</b>		
<b>ORI Reports Researcher's Exoneration</b>	<b>286</b>		

*The Physiologist*  
Published bimonthly and distributed by  
The American Physiological Society  
9650 Rockville Pike  
Bethesda, Maryland 20814-3991  
ISSN 0031-9376

**Martin Frank**  
*Editor and Executive Director*

**Leonard S. Jefferson** *President*  
**Brian R. Duling** *Past President*  
**James A. Schafer** *President-Elect*

*Councillors*  
**Walter F. Boron, Gerald F. DiBona, D. Neil Granger,**  
**Barbara A. Horwitz, Diana L. Kunze, Heinz Valtin**

*Ex Officio*  
**Leonard R. Johnson, Franklyn G. Knox, Francis L. Belloni,**  
**Ethan R. Nadel, Richard J. Traystman**

**Publications Committee:** *Chairman,* Leonard R. Johnson;  
*Members,* Dale Benos, Jerome A. Dempsey, Lorne Mendell, John A. Williams, and Loring R. Rowell (ex officio). *Publications Manager,* Brenda B. Rauner.

**Subscriptions:** Distributed to members as part of their membership. Nonmembers in the USA: individuals \$25.00; institutions \$37.00. Nonmembers elsewhere: individuals \$35.00; institutions \$48.00. Single copies and back issues when available, \$10.00 each; single copies and back issues of Abstracts issues when available, \$20.00. Subscribers to *The Physiologist* also receive abstracts of the Conferences of the American Physiological Society.

The American Physiological Society assumes no responsibility for the statements and opinions advanced by contributors to *The Physiologist*.

Deadline for submission of material for publication: Jan. 1, February issue; March 1, April issue; May 1, June issue; July 1, August issue; Sept. 1, October issue; Nov. 1, December issue.

**Please notify the central office as soon as possible if you change your address or telephone number.**

Headquarters phone: 301-530-7118. Fax: 301-571-8305.

Printed in the USA.

## Don't Bar the Door...Let Them In

Many letters have been written by distinguished physiologists and younger members of our profession emphasizing that this is a unique period for funding of biomedical research. Since I began my professional career in 1956 there has never been so much pessimism expressed by so many. Grants are exceedingly difficult to obtain, particularly for the younger members of our profession. They will become even more difficult to obtain if Congress passes the budget cuts it promises, reducing biomedical research funding approximately 30% by the year 2002. The severe reduction in research support will make it even more difficult for young scientists to obtain research funding or to find academic positions for which they have been trained.

How has this situation come about? There are probably almost as many answers to that question as there are people who ask it. One thing is certain: less money is available now to support worthy projects than at any time in the past 35 years. Additionally, financially strapped universities and colleges are unable to hire sufficient faculty to ease the backlog of young investigators waiting their turn to enter the academic world as full-fledged members.

Matyas and Frank (2) presented some data relating to the problem of oversupply and underfunding. In Fig. 1, I have used those data to plot the results of their study and visually present the extent of the problem. The curve labeled "total PhDs" represents the sum of postdoctoral fellows and new PhDs awarded to American citizens and permanent residents. During the past 14 years we have decreased the number of PhDs granted in physiology by about 30%, but at the same time the number of postdoctoral fellows has increased by 60%, from 494 to 786. Academic job openings steadily declined, from a high of 104 in 1984 to 54 in 1992, yet 199 new PhDs were awarded in 1992. Each year the difference between academic jobs available and the number people seeking jobs is growing.

This discrepancy highlights our failure as mentors to our young colleagues. It is evident that a reduction in the production rate of new PhDs would bring the top and bottom curves of Fig. 1 closer together. However, that solution has been a topic of conversation in most departments for some time, and little has been done to alleviate the surplus of PhDs waiting in limbo. I propose a partial solution to this problem, which has not yet been discussed in any great detail.

First, I wish to preface my partial solution with the observation that we, as senior members of the scientific community, owe the young a great deal. We were the people who helped train them for a profession that is now unable to support them, no matter how able they are. We continue to send brochures and posters to colleges to attract graduate students, and we set up training programs for them, knowing full well that our graduates will have a difficult time obtaining an academic position. We continue trying to lengthen our curriculum vitae, as if more papers will do more for our reputation.

Graduate students help us in our own research, add to our curriculum vitae, and, when their time is up, we give them a PhD and send them on their way to become what may best be described as postdoctoral fellows emeritus. We owe our students more.

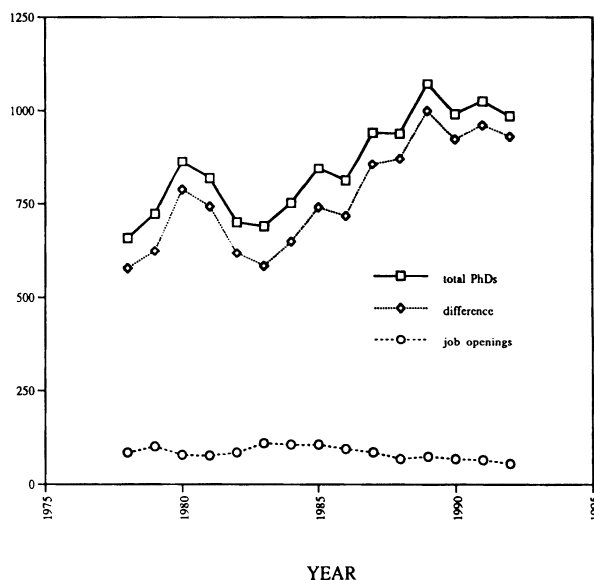


Figure 1. Data on jobs available vs. those seeking jobs, recalculated from Matyas and Frank (1). Total PhDs is the sum of postdoctoral students plus new PhDs awarded. Difference represents the difference between total PhDs and job openings.

More may be given. We at the top should recognize that full professors of my generation (65+) have had a wonderful time. We lived during the time of plenty; we published and traveled to conferences throughout the country and the world. We lived the good life.

Unfortunately, many of us look at our own research contributions as ground breaking and believe we must continue working the same way we did in the past; our contributions were so important, the scientific world can hardly move ahead without more of them. I submit that we overestimate our contributions. It is a common human failing. We may also believe that science will progress faster if we remain as active as we did years ago. I also submit that our replacement by a young investigator may actually allow a mind into the field that is at least as productive and certainly will produce for a longer time.

My solution? Do not hang in there until you are so old you find it difficult to manage. Step down at 65 and become an active Professor Emeritus. It might appear that the retirement of only a few full professors will not make a dent in the academic openings for physiologists. However, that is not so. If only 25 additional people become emeritus professors, and if most of their salary money is used for new hires, there will be a 100% increase in job openings!

Reduce your research commitment. One small grant is enough. Free up university salary money for at least one more Assistant Professor. (In many institutions, a full professor's salary equals the sum of two Assistant Professors, with some money to spare.) Mandel (1) has pointed out that only 12% of first time R01 applications are funded. Free up money at NIH and NSF for the young who are not part of the "old boys" network and who find it almost impossible to obtain a grant.

I do not suggest that each investigator stop work immediately on his or her 65th birthday. Rather, find other productive outlets for talents developed over a lifetime. We have unique abilities that should not go unused. Become involved in mentorship programs. They exist in all schools and offer a most rewarding experience to the mentors, as well as valuable advice and experience to the young. Do not be afraid to use your knowledge to help young physiologists write grants, present papers at meetings, design research projects, and do all the things we learned long ago.

If you care about future generations, enroll as volunteer scientists in the Science by Mail Program<sup>1</sup>, in which scientists act as mentors to primary and secondary school students, guiding them through simple science projects. You will have the opportunity to become pen pals with some bright, lively, interesting youngsters. You may also help a few start on the road we trod long ago.

In your own community, primary and secondary schools, as well as community colleges, will be most receptive to your volunteering to present a lecture or two on your field of

expertise. The students will be equally receptive to your talk.

If speaking to younger people is not to your liking, try giving a course to undergraduate students. They are bright and earnest, and if they choose your course they do so because they are interested in the subject. It is particularly gratifying to spend a few hours a week with students who are truly interested in what you have to say.

If none of the above interests you, become involved in the political aspects of our profession. Now, more than ever, we need to educate our state and federal legislators about the need for continued support of the sciences (particularly the biomedical sciences), as well as the danger of the growing antivivisectionist attacks on animal research. Your representatives need input from knowledgeable and articulate constituents. If you don't know where to start, I am certain the American Physiological Society office will help you. You need not vegetate when you retire. You can serve your profession in new and important ways. I urge you to do so.

Don't bar the door. Let them in.

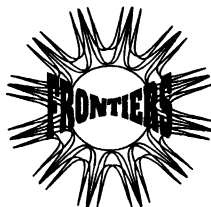
*Richard L. Malvin  
University of Michigan*

### References

1. Mandel, H.G. Funding of NIH grant applications: update. *Science* 269:13-14, 1995.
2. Matyas, M., and M. Frank. Physiologists at US medical schools: education, current status, and trends in diversity. *Physiologist* 38:1-12, 1995.

<sup>1</sup> Science by Mail, 800 McKinley Monument Drive, NW, Canton, OH 44708-4800 (Phone 216-455-7043).

## Applications Available for Frontiers in Physiology 1996 Science Teacher Summer Research Program



**Don't miss the application deadline!**  
**Friday, January 5, 1996**

Applications and contact lists are now available for the 1996 Frontiers in Physiology Science Teacher Summer Research Program. Through the Frontiers program, middle and high school science teachers spend 7-9 weeks during the summer working in the research laboratory of an APS member who serves as a research host.

Applications are developed jointly by the science teacher and the APS member in whose laboratory the teacher will be working. All applications must be received at the APS Education Office by Friday, January 5, 1996. Applicants will be notified of their acceptance by March 8, 1996.

If you are interested in receiving an application to pass on to a science teacher, science supervisor, or principal, please contact: APS Education Office, Frontiers in Physiology, 9650 Rockville Pike, Bethesda, MD 20814-3991; or call Phyllis Edelman, Project Coordinator, (301) 571-0692; email: pedelman@aps.faseb.org; or fax (301) 571-8305.



**PHYSIOLOGY INFOCUS**  
**GENETIC STRATEGIES FOR UNDERSTANDING THE PHYSIOLOGICAL**  
**BASIS OF DISEASE**  
**ORGANIZER: RAYMOND A. FRIZZELL (UNIVERSITY OF PITTSBURGH)**  
**EXPERIMENTAL BIOLOGY '96**  
**APRIL 14-17, 1996**  
**WASHINGTON, DC**

**Monday, April 15 AM****Genetic Tools for Physiological Studies**

Organizer: Garry R. Cutting (Johns Hopkins Univ.)

**Human Genome Project**

Francis Collins (NCHGR-NIH)

**Computerized DNA and Protein Sequence Databases**

Mark Boguski (National Library Medicine)

**Identification of Novel Cell Cycle Components by Recombinant Genetic Approaches in Yeast**

Phil Hieter (Johns Hopkins University)

**Cloning of Genes Responsible for Neurogenetic Variants of *Drosophila melanogaster***

Barry Ganetzky (Univ. Wisconsin-Madison)

**Monday, April 15 PM****Transgenic Strategies for Physiological Studies**

Organizer: Craig Malbon (SUNY, Stony Brook)

**Dissection of Brain Function by Gene Knockout**

Susumu Tonegawa (MIT)

**G-Proteins and Development: Scoring a Technical Knock Out (TKO) *in vivo***

Craig Malbon (SUNY, Stony Brook)

**Creating Monogenetic and Polygenetic Models of Diabetes Mellitus**

Ronald Kahn (Harvard)

**Analysis of Pattern Formation in Mammals: Knocking Genes "In" & "Out"**

Alexandra Joyner (NYU)

**Tuesday, April 16 PM****Genetic Diseases Affecting Ion Channels**

Organizer: Raymond A. Frizzell (Univ. Pittsburgh)

**Periodic Paralysis and Myotonias: Roles of Na and Ca Channels**

Eric Hoffman (Univ. Pittsburgh)

**Chloride Channel Dysfunction in Myotonia**

Thomas Jentsch (University of Hamburg)

**Muscular Dysgenesis**

Kurt Beam (Colorado State Univ.)

**Malignant Hyperthermia**

David MacLennan (University of Toronto)

**Cystic Fibrosis: CFTR Regulation of Na Channels**

Richard Boucher (Univ. North Carolina)

**Wednesday, April 17 AM****Ion Sensors and Transporters in Health and Disease**

Organizer: Steven C. Hebert (Harvard)

**The Extracellular Ca<sup>2+</sup>-Sensing Receptor: Roles in Health and Disease**

Edward Brown (Harvard)

**Cell-Surface Virus Receptors Provided by Sodium-Dependent Phosphate Transporters**

Michael P. Kavanaugh (Oregon Health Sciences)

**Glutamate Transporters: Implication in Neurological Diseases**

Jeffrey D. Rothstein (Johns Hopkins Univ.)

**Molecular Genetics of Cystinuria**

Matthias Hediger (Harvard)

**Experimental Biology '96****Deadlines****February 23****Advance Registration****March 14****Housing Reservations****APS Membership**

Membership applications may be obtained from APS Membership Services, 9650 Rockville Pike, Bethesda, MD 20814-3991. Applications are reviewed and approved by Council on a regular basis throughout the year.

(continued from page 265)

undermine the quality of life we have come to expect. My job as a research scientist, a dean, and a recently practicing policy wonk is to make the case for scientists to become involved in the national educational initiative that must commence and be sustained to ensure a quality future for ourselves, our children, and generations to come.

There is no doubt that a great deal is already happening. What we must begin today is the national coordinated partnership that allows us to build on our successes, to understand our failures, and to identify new ways of doing business across sectors and with a new optimism.

Nonetheless, let me review some sobering statistics and observations. *The Sacramento Bee* cited the following statistics: in 1950, 60% of all workers in the US were unskilled; in 1990, that figure was 35%; the projection for the year 2000 is that only 15% of all jobs will require unskilled workers. By the end of this decade, 44% of US workers will be in the business of collecting, analyzing, synthesizing, storing, or retrieving data.

In a 1989 survey of US CEOs, two-thirds responded that they had difficulty in hiring workers due to lack of basic skills. Eighteen- to twenty-three-year-old adults with difficulty in academic skills are five times more likely to receive public assistance and have a poverty-level income.

There are other compelling points about which we need to be concerned. Much of this information can be found in the 1993 edition of the National Science Board document *Science and Engineering Indicators* (1).

While the recently released Critical Technologies Report notes that the US is still the leader in most technologies, the

margin by which we excel is shrinking rapidly. This is partly due to the fact that nations with whom we trade and compete realize that scientific education and literacy are important to their future.

For many decades the US and the European countries have dominated the scientific workforce. However, in 1990, six Asian countries produced more than one-half million natural science and engineering baccalaureates, slightly more than the US and Europe. Although the US has twice as many scientists and engineers in research and development,

Teacher	Percent of all students
Major in math/math ed.	43.3
Minor in math/math ed.	27.1
Major in education	18.2
Other major	11.4

Japan and the US have equal proportions in the workforce. Japan's ratio appears to be increasing while that of the US is leveling off.

Although the US and Canada outstrip most nations in overall baccalaureate degree production, the percentage of degrees that go to individuals with science and engineering majors is proportionately less than in Japan.

Of particular note for the future is the fact that even in countries with limited overall participation in advanced education such as Mexico and China, those who do get degrees in science and engineering (S&E) are a much higher proportion of the total: 25% in Mexico and almost 50% in China.

Thus, although our overall access to higher education is comparatively good, our proportional share of those skilled in S&E is dropping at a time when projections forecast an increasingly competitive international market and a need for more men and women with a science background.

This is an ominous trend that cannot wait for a more fortunate fiscal moment for repair. Economists nearly unanimously agree that a nation's economy is a derivative of its workforce and its investment in science and research and development. Indeed, one could argue that the present deficit everyone is rushing to cut is only a symptom of a much more serious educational deficit that no amount of cutting can fix in the long term.

In short, scientists need to become involved and become partners in solutions. The reasons are simple: the economy depends upon it, science education and literacy is the business of scientists, and it is the right thing to do. Finally, there is always self-interest. If there is no national interest in science and no public literacy in science, there will be no support for science in the national interest.

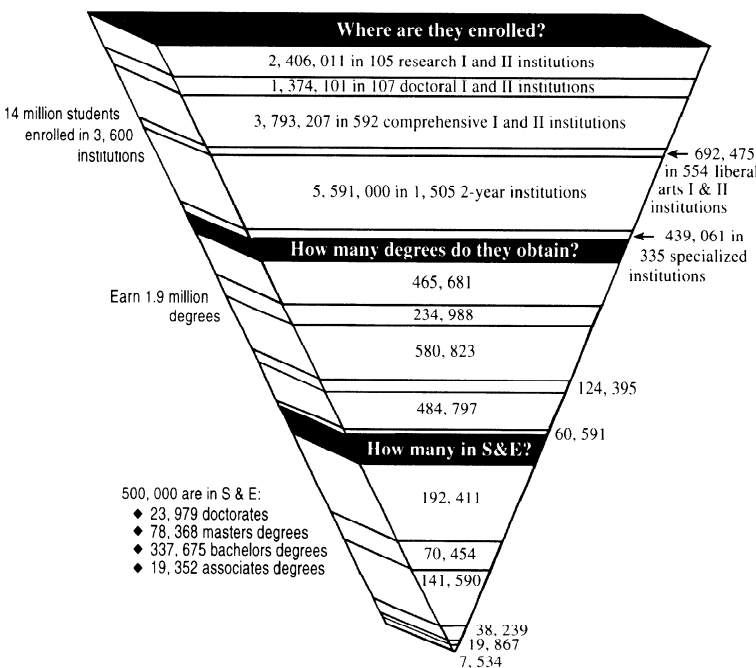


Figure 1. US higher education in 1991: students, institutions, and degrees (from Ref. 1).

Percentage of students who answered "often"

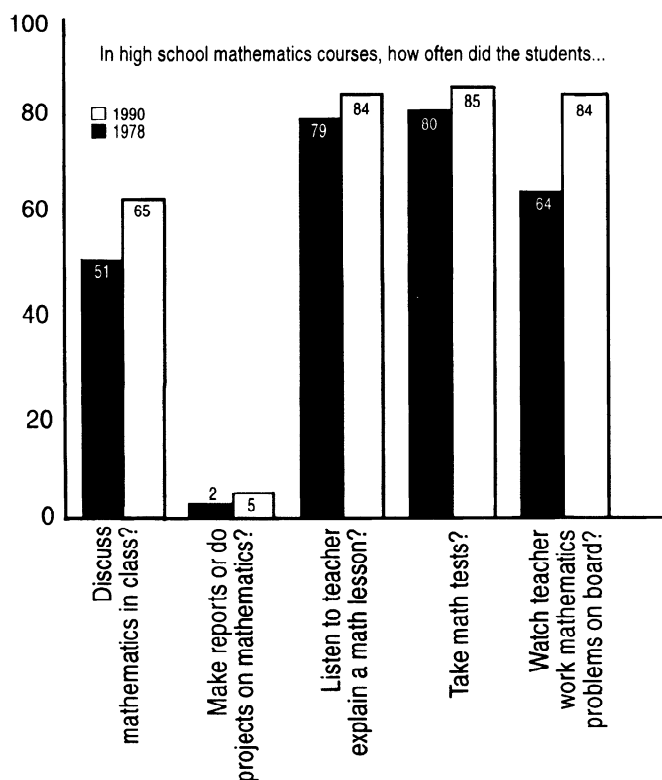


Figure 2. Mathematics classroom activities as reported by 17-year-old students (from Ref. 1).

## Invigorating the Public Interest

What should scientists do? First, we need to form partnerships with other segments of higher education. The S&E workforce is made up of the knowledge creators of the future and those who can utilize this knowledge and is formed by a complex educational system. Our higher education system's greatest strength is its depth and multiple routes of access for our citizens. Its greatest weakness is its sector factionalization (Fig. 1).

In our educational system, 14 million students are enrolled in 3,600 institutions. They earn 1.9 million degrees a year, of which 500,000 are in S&E areas. This is the system that produces our teachers, researchers, policy makers, and legislators. The components of the system must work together to maximize its collective strengths and to focus its selective strengths.

Although I spent nearly a decade at a selective liberal arts college, I currently work for and represent a land-grant Research I university. Personal experience has demonstrated that few faculty or administrators in either sector know much about the other. Both need to learn to work better with colleagues in the comprehensive universities and community colleges where many teachers of the future get their preservice training.

We need to work directly and creatively with teachers and students. More importantly, we must also work within the

higher education system for which we share the greatest responsibility. Our critics rightfully expect us to fulfill this responsibility.

What else can we do?

Start at home. Some scientists may claim that they are not trained to work with precollege teachers or students. They do, however, have the skills and the responsibility for improving the quality of the undergraduate general and science education in their own institution. As many an administrator has learned, in most of our institutions the power of the faculty over the curriculum is virtually absolute. It is time for us to take our academic senate responsibilities ever more seriously. The US cannot lead if we cannot improve the level of science and math competency in areas where scientists have the most influence.

One should also be concerned about training teachers. I have selected mathematics to illustrate two additional observations, mainly because it is fairly typical and space does not allow me to review all science areas (Table 1). For example, many students are taught math by teachers who have not had an extensive subject matter immersion themselves (Fig. 2). The observations of 17-year-olds about their math classroom suggests that these classrooms may not be as inspiring as we need them to be. No matter how talented a teacher is, nothing substitutes for mastery of the material, love of the disci-

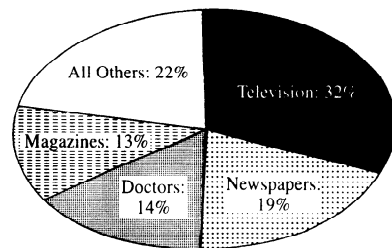


Figure 3. Primary sources of health information: 1993 (from Ref. 1).

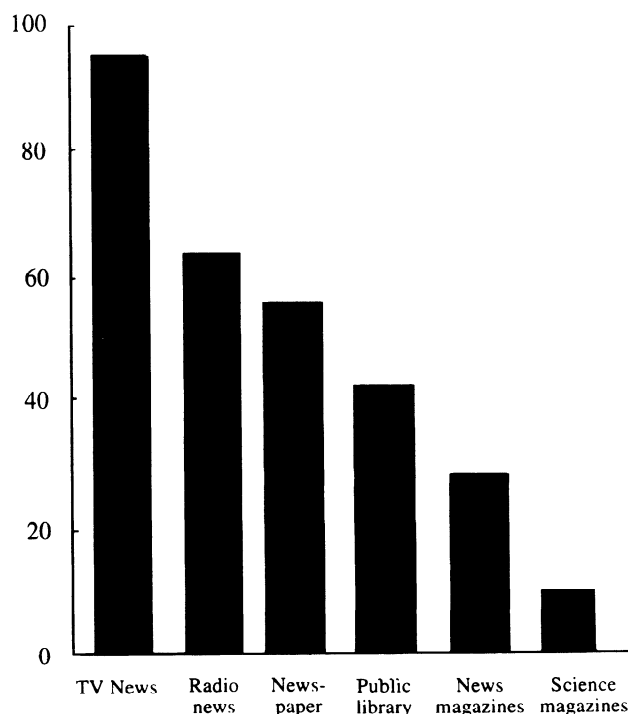


Figure 4. Public use of selected information sources: 1992 (from Ref. 1).

pline, and curiosity, which leads to life-long learning.

We also need to work with the media. Public use of selected information sources for science comes predominantly from the media (Fig. 3). Even in the health field, where there is a vast health care network and multiple professional contact points, most information that the public gets and uses is conveyed by the media (Fig. 4). We must involve the media and ensure that the focus is not exclusively on those who have a deep interest in science. To paraphrase Willie Sutton, that is where the action is. It is clear that we need news professionals trained to understand science as well as science educators and scientists with a sophisticated understanding of the media.

The good news is that the public still considers scientific professionals to be relatively credible (Fig. 5). Scientists are seen as much more reliable than the press and somewhat more reliable than the Supreme Court. Nonetheless, scientists are not escaping the growing anti-intellectualism and skepticism of the public. While the majority think scientists are trying to do good, nearly 50% think that scientists fabricate data to further their careers (Fig. 6).

Finally, we must work outside the formal system of education, especially to improve general public interest and knowledge. For example, one program that we are involved in at the University of California, Davis is an industry education collaboration for developing science literacy. This program uses the Fetzer Vineyards' Valley Oaks Farm organic garden to teach students and their families about plants and nutrition. A premier chef also volunteers to help them learn how to prepare their produce. The program includes a festival that involves parents. It is fun, it teaches basic principles, and it takes place in a lovely setting outside the classroom, making science part of everyday life.

Another example of an extra classroom collaboration is an

Percentage reporting high level of confidence

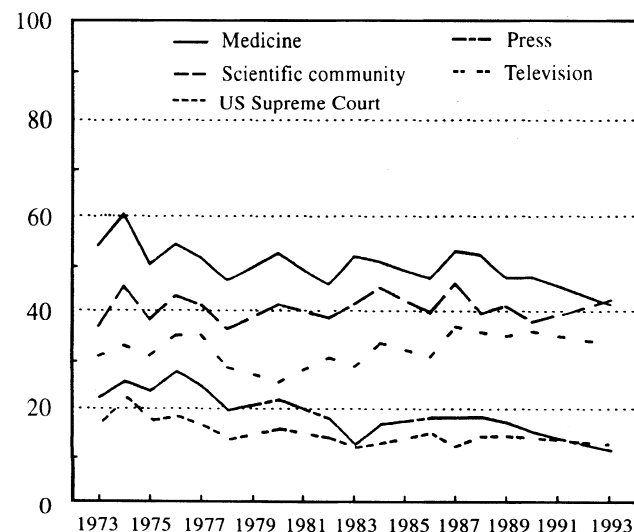


Figure 5. Public confidence in leadership of selected institutions (from Ref. 1).

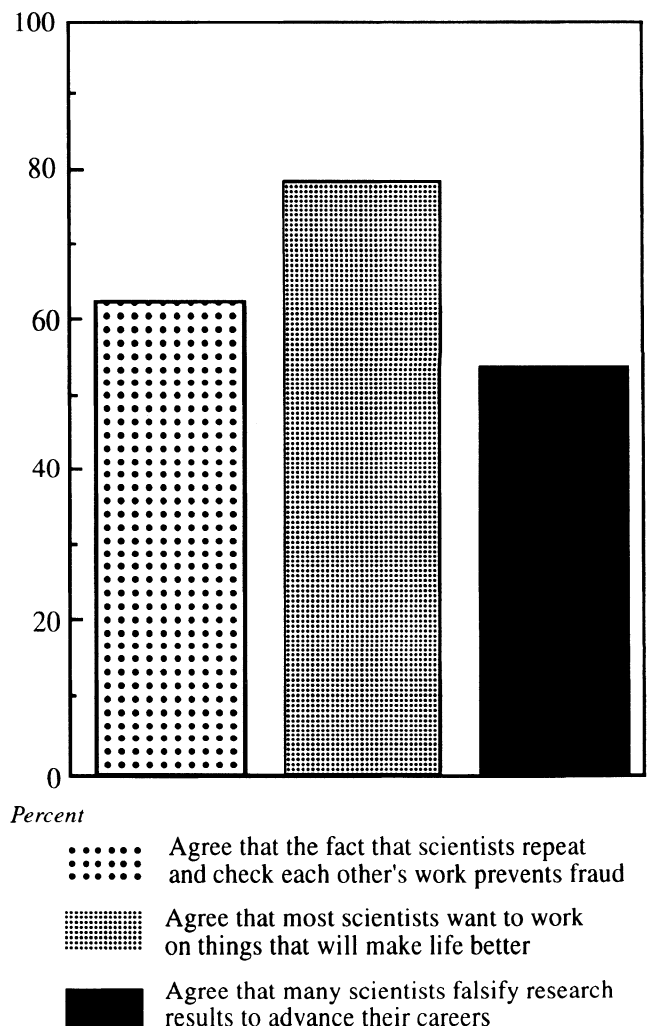


Figure 6. Public attitudes towards scientists (from Ref. 1).

informal program with the Society of Women Engineers (SWE). The Science Experiences and Resources for Informal Education Settings (SERIES) involves teens as leaders for a set of science concepts that use out-of-school settings such as scouts, 4-H clubs, etc. Members of SWE act as coaches along with engineers from the Society of Hispanic Engineers and the Society of Black Engineers.

If we are to preserve our nation's standing in science, technology, education, and discovery, we must begin today. We must agree that our highest priority is to develop and support school programs, media programs and informal educational experiences so that learning the elements of science and technology is just as common for our public as learning to shoot hoops, play baseball, or read a good book.

## Reference

1. National Science Board. *Science and Engineering Indicators*. Washington DC: US Government Printing Office, 1993. (NSB 93-1)

## Newly Elected Members

The Membership Committee reviews applications in the spring and fall of each year. This fall we recommended acceptance of a total of 178 applications for membership. Of these, about one-third were from countries outside the Americas. This brings the total number of new members to 353 for 1995.

Table 1. New members, Fall, 1995

	Total No.	Average Age, yr.	% Junior Rank	% Senior Rank
Regular	126	39	75	25
Corresponding	52	41	64	36

Junior rank is defined as < Associate Professor, and senior rank is defined as ≥ Associate Professor.

### APS Membership as of November 1995

Regular	5582
Emeritus	915
Honorary	31
Corresponding	645
Affiliate	10
Student	668
<b>Total</b>	<b>7851</b>

### Regular Members

**Isam Abu-Amarah**  
University of Calgary

**Gianfranco Alpin**  
Texas A&M University

**Raj Bawa \***  
Johns Hopkins University

**John Townsend Berg**  
University of California, San Diego

**Dan Berkowitz**  
Johns Hopkins University

**Klaus Bielefeldt**  
University of Iowa

**Andrew A. Biewener**  
University of Chicago

**Susan Ann Bloomfield**  
Texas A&M University

**Nicholas Theodore Carnevale**  
Yale University

**Shaoyou Chu**  
Johns Hopkins University

**Roberto Civitelli**  
Jewish Hospital of St. Louis

**Joseph Clark**  
University of Oxford

**Lane Leroy Clarke**  
University of Missouri

**Gary Wayne Cline**  
Yale University Medical School

**Eduardo Colombari**  
Escola Paulista de Medicina

**Alain S. Comtois**  
University of Montreal

**Kevin E. Conley**  
University of Washington Medical Center

**David N. Cornfield**  
University of Minnesota School of  
Medicine

**Stephen F. Crouse**  
Texas A&M University

**Derek Scott Damron**  
Cleveland Clinic Foundation

**Lowell Even Davis**  
Oregon Health Sciences University

**Timothy Richard Degrado**  
Duke University Medical Center

**Joseph M. Delehanty**  
University of Rochester

**Michel Desautels**  
University of Saskatchewan

**Raghvendra Krishna Dubey**  
University of Pittsburgh Medical Center

**Randall L. Duncan**  
Indiana University

**Esther E. Dupont-Vestegden \***  
VA Hospital, Little Rock

**Samir S. El-Dahr**  
Tulane University School of Medicine

**Karyn Esser**  
University of Illinois at Chicago

**Michel Farhat**  
Georgetown University Medical Center

**Jeanne M. Foley**  
Michigan State University

**Raymon M. Glantz**  
Rice University

**John Robert Gosche**  
Yale University School of Medicine

**Manjapra Vapiath Govindan**  
Laval University Medical Center

**Mark D. Grabiner**  
Cleveland Clinic Foundation

**Karen Ann Griffin**  
Loyola University Medical Center

**James B. Grotberg**  
Northwestern University

**Edward N. Guillery**  
University of Wisconsin

**Dean C. Gute**  
Louisiana State University Medical Center

**Pierre Haddad**  
University of Montreal

## MEMBERSHIP

---

**W. Matt Hameister**  
3M Pharmaceuticals

**Owen P. Hamill**  
University of Texas Medical Branch

**Polly A. Hansen**  
Washington University School of Medicine

**Matthias Albrecht Hediger**  
Brigham & Women's Hospital

**Douglas N. Henry**  
Michigan State University

**Stuart N. Hoffman**  
Stanford University Medical Center

**Emilia M. Hogan**  
Yale University School of Medicine

**Stephen Idell**  
University of Texas Health Science Center

**Igor Izrailtyan**  
Medical College of Pennsylvania and Hahnemann University

**Miles G. Johnston**  
Sunnybrook Health Science Center

**Pamela Parker Jones**  
University of Colorado

**Thomas Jue**  
University of California, Davis

**Satish C. Kalhan**  
Rainbow Babies & Children's Hospital

**Sanjiv Kaul**  
University of Virginia

**Jonathan D. Kaunitz**  
University of California, Los Angeles

**Judy R. Kersten**  
Medical College of Wisconsin

**Mark Kester**  
University Hospitals of Cleveland

**Srinivasa Murthy Karnam**  
Medical College of Virginia

**Robert G. Kilbourn**  
Houston, Texas

**Ellen E. Ladenheim**  
Johns Hopkins University School of Medicine

**Nicholas J. Laping**  
SmithKline Beecham

**Abraham D. Lee**  
Washington University School of Medicine

**Jose Llanos-Quevedo**  
National University of Trujillo

**Christopher A. Loretz**  
SUNY at Buffalo

**Richard L. Lubman**  
University of Southern California

**Shyama Mary Elizabeth Masilamani**  
Ohio State University

**Joseph Mattana**  
Long Island Jewish Medical Center

**Vikki L. McCleary**  
University of North Dakota School of Medicine

**James Donald McCully**  
Harvard Medical School

**Robert L. Meckler**  
City College of San Francisco

**David W. Mercer**  
University of Texas-Houston Medical School

**Robin Nicholas Michel**  
Laurentian University

**Patricia E. Molina**  
SUNY Stony Brook

**Christopher D. Moyes \***  
Queens University

**Suhayla Mukaddan-Daher**  
Hotel Dieu Hospital, Montreal

**Lawrence J. Mulligan**  
Deborah Research Institute

**Daniel K. Nelson**  
University of Rochester

**David C. Nieman**  
Appalachian State University

**Jing Ning**  
Hemosol Inc.

**Edward R. O'Connor**  
Yale University School of Medicine

**Merle S. Olson**  
University of Texas Health Science Center

**Nariman Panahian**  
Harvard Medical School

**Yves Ouellette**  
Children's Hospital Western Ontario

**Christopher A. Pappas**  
Yale University School of Medicine

**Kyunh Won Park**  
Beth Israel Hospital

**Jeffrey Pessin**  
University of Iowa

**Stuart M. Philips \***  
Shriners Burns Institute

**Gloria S. Pryhuber**  
University of Rochester

**Appavoo Rengasamy**  
University of Virginia Health Sciences Center

**Stephen Rimar**  
Yale University School of Medicine

**Timothy W. Robinson**  
University of Southern California

**John L. Rombeau**  
University of Pennsylvania Hospital

**Mary Scanlon**  
Morehouse School of Medicine

**Ben-Quan Shen**  
Children's Hospital Oakland

**Xiaocai Shi \***  
Quaker Oats Company

**Randi B. Silver \***  
Cornell University Medical College

**James J. Smith**  
Duke University Medical Center

**Virend K. Somers**  
University of Iowa College of Medicine

**Gerald J. Taborsky**  
Seattle VA Medical Center

**Leonid Tell**  
Akmola State Medical Institute

**Jorge Eduardo Tobilli**  
Buenos Aires University

**Michael Miller Todd**  
University of Iowa College of Medicine

**Carol E. Torgan \***  
Duke University Medical Center

**Chung-Ming Tse**  
Johns Hopkins Hospital

**Krista Vandenborne**  
University of Pennsylvania Medical Center

**Itzick Vatnick**  
Widener University

**Michael E. Vayda**  
University of Maine

**Margaret A. Vizzard \***  
University of Pittsburgh School of  
Medicine

**Tingchung Wang**  
University of Rochester

**WenHui Wang**  
New York Medical College

**Paul A. Welling**  
University of Maryland School of Medicine

**Timothy J. Wester**  
Baylor College of Medicine

**Richard E. White**  
Wright State University School of  
Medicine

**A. Richard Whorton**  
Duke University Medical Center

**Patricia A. Wight**  
University of Arkansas for Medical  
Sciences

**Marc E. Wiles**  
George Washington University Medical  
Center

**Robert W. Wiseman**  
University of Washington Medical Center

**Michael L. Woodruff**  
University of California, Los Angeles  
School of Medicine

**Ronald E. Worthington**  
Mosby, Inc.

**Dwayne Sonny Yamasaki**  
University of Wisconsin, Madison

**Jang H. Youn**  
University of Southern California School of  
Medicine

**Andrew Arthur Young**  
Amylin Pharmaceuticals, Inc.

**Jeff Zachwieja**  
Pennington Biomedical Research Center

**Raphael Zahler**  
Yale University School of Medicine

**Ai-Ping Zou**  
Medical College of Wisconsin

**Jay L. Zweier**  
Johns Hopkins Asthma and Allergy Center

## Corresponding Members

**Dario Acuna-Castroviejo**  
Catedrático de Fisiología Médica

**Mayuki Aibiki**  
Kagawa Medical School Hospital

**Mohammed Al-Obaidi**  
Philadelphia College of Osteopathic Medicine

**Heather J. Ballard**  
University of Hong Kong

**Dave Bates**  
University of California, Davis

**Serge Brimiouille**  
Erasmus Hospital

**Qi Chen**  
School of Medicine in Shreveport

**Weina Chen**  
Duke University

**Wolfgang Clauss**  
Institut für Tierphysiologie

**Michel Corboz**  
University of South Alabama College of  
Medicine

**Antonino Delorenzo**  
University of Rome "Tor Vergata"

**Yong Du**  
University of Texas Medical Branch

**Georg Ertl**  
Universität Heidelberg

**Yoshitaka Fuji**  
Tokyo Medical and Dental University

**Fadia Haddad**  
University of California, Irvine

**Zoltan Hantos**  
Albert Szent-Györgyi Medical University

**Arnold Honig**  
University of Greifswald

**Ferdinando Iellamo**  
University of Rome "Tor Vergata"

**Ricardo Insausti**  
Universidad Navarra

**Kinji Ishikawa**  
Kinki University School of Medicine

**Takeshi Ishizaki**  
Fukui Medical School

**Jover Bernard Francois**  
INSERM-Civil Servant National Health  
Institute

**Peter L. Kerkhof**  
University of Utrecht

**Wieslaw Kozak**  
The Lovelace Institutes

**Sangdon Koh**  
Hanyang University

**Dietmar Kultz**  
National Institutes of Health

**Jacopo Maria Legramante**  
University of Rome "Tor Vergata"

**Yvan Lopez**  
University of Arizona College of Medicine

**Gordon, S. Lynch**  
University of Michigan

**Noriyuki Miyata**  
Taisho Pharmaceutical Co.

**Svetlana E. Nikoulina**  
University of California, San Diego

**Yasumasa Okada**  
University of North Carolina



## MEMBERSHIP

---

**Shuichi Ono**

University of Texas Medical School,  
Houston

**Julian Panes**

Universitat Barcelona

**David G. Parkes**

University of Melbourne

**Christian-Gabriel Prefaut**

Centre Hospitalier Universitaire

**Gilad Rimon**

University of the Negev

**Aida Marino Sanchez**

Basque Country University

**Jean Louis Saumet**

Faculte de Medecine d'Angers

**Pietro Scotto**

University of Catanzaro

**Chandan K. Sen**

University of California, Berkeley

**Sabyasachi S. Sircar**

University College of Medical Sciences

**Bernard Swynghedauw**

INSERM-Hopital Lariboisiere

**Ewa Szczepanska-Sadowska**

Warsaw Medical Academy

**J. H. Van Der Hoeven**

University Hospital Groningen

**Danny Ling Wang**

Institute of Biomedical Sciences

**Ichiro Watanabe**

Nihon University School of Medicine

**Peter William Watt**

Dundee University

**Wolf-Michael Weber**

Institute for Animal Physiology

**Kazuhiko Yoshimura**

Shinshu University School of Medicine

**Jinhua Zhao**

Yale University School of Medicine

**Driss Zoukhri**

Schepens Eye Research Institute

### Affiliate Members

**Bob Melton**

Putnam City Schools, Oklahoma City

**Kate O'Brien**

US Army Research Institute of  
Environmental Medicine

**Stan Smith**

Warrensburg, MO

**Ernest Schiller**

Central Lee High School, Donnellson, IA

**Emma D. Underdown**

Mosby Publishing

### Student Members

**Anna N. Ahn**

University of California

**Elie D. Al-Chaer**

University of Texas Medical Branch

**Yaw Appiagyei-Dankah**

Tulane University Medical School

**David Mark Baekey**

University of South Florida College of  
Medicine

**Scott L. Baker**

University of South Dakota  
School of Medicine

**M. Elizabeth Bell**

University of Oklahoma

**Bradley R. Berg**

University of Rochester

**Raynald Bergeron**

University of Montreal

**Mark O. Bevenssee**

Yale University

**Andre Boivin**

Laval University

**Anne Lynn Bradford**

University of Alabama, Birmingham

**John Byon**

Tulane University Medical Center

**Shelton D. Caruthers**

Vanderbilt University

**J. Paulo Castro**

St. John's University

**Ter-Hsin Chen**

Iowa State University

**Anthony Cheung**

Tulane University Medical Center

**Sy Chin**

Tulane University Medical Center

**Trina L. Cofield**

Howard University

**Lisa K. Conley**

University of Milwaukee, Wisconsin

**Kevin David Costa**

University of California, San Diego

**George Crist**

Pennsylvania State University

**John E. Croom**

Oklahoma University  
Health Science Center

**Michael S. Davis**

Johns Hopkins University

**Paul G. Davis**

University of South Carolina

**Qadriyyah J. Debnam**

Meharry Medical College

**Brant Allen Defanti**

University of California, Davis

**Nilsa F. Del Valle**

University of Puerto Rico School of Medicine

**Francois Desy**

University of Montreal

**Mark Wayne Doyle**

Oregon Health Sciences University

**Ruisheng Du**

University of South Dakota

**Joey Charles Eisenmann**

College of Health Professions

**Vincent Encomio**

San Francisco State University

**Pauline L. Entin**

Cornell University

**Sylvain Ernest**  
University of Texas  
Medical Branch of Galveston

**Sepehr Eskandari**  
California State Polytechnic University,  
Pomona

**Jinping Fan**  
University of South Carolina

**Michael, A. Ferguson**  
University of South Carolina

**Elizabeth Fernandez-Marques**  
University of Alabama, Birmingham

**John J. Foxe**  
Albert Einstein College of Medicine

**David Dwight Fuller**  
University of Arizona

**Timothy P. Gavin**  
Indiana University

**Jennifer C. Graham**  
University of Pittsburgh

**Felicia Greer**  
University of Guelph

**Patricia A. Halpin**  
University of Connecticut

**Christopher Allen Hathaway**  
University of South Dakota School of  
Medicine

**Darren Scott Heeke**  
San Jose State University

**Jay K. Herman**  
University of Texas at Arlington

**Karl M. Hermann**  
Texas A&M University

**Ken Hoekstra**  
University of British Columbia

**Omotola Hope**  
City College of New York

**Eric Michael Horn**  
University of Illinois

**Noel D. Horton**  
University of Kentucky

**Brynn H. Jones**  
University of Tennessee

**Namrata M. Kaul**  
University of Mississippi

**Doojin Kim**  
University of California, Los Angeles

**Lipu Kong**  
Louisiana State University Medical Center

**Darrell L. Lange**  
University of Texas Health Science Center

**Tanya LaPier**  
Idaho State University

**Martin G. Latour**  
University of Montreal

**Paul J. Laurienti**  
University of Texas Medical Branch

**Hsueh-tze Lee**  
Harvard School of Public Health

**Alex B. Lentsch**  
Northern Kentucky University

**Jin Li**  
Texas Tech University Health Science  
Center

**Xue Mei Lin**  
University of South Dakota

**Shenwei Liu**  
New Jersey Medical and Dental School

**Vicki L. Lowes**  
University of Calgary

**Robert F. Lundy**  
Florida State University

**Carolyn M. Macica**  
New York Medical College

**Lisa Dianne Mader**  
Georgia State University

**Sean P. Marrelli**  
Baylor College of Medicine

**Louis Martineau**  
Simon Fraser University

**Ralph P. Matott**  
University of Connecticut

**Kyle Patrick May**  
University of N. Texas Health Science Center

**Emilio Mazza**  
UMDNJ-Robert Wood Johnson Medical  
School

**Steven R. McClaran**  
University of Wisconsin

**Nansie Anne McHugh**  
Rutgers University

**Timothy J. Mickel**  
University of Hawaii

**Jason M. Miller**  
Tulane University Medical Center

**Jennifer Bernadette Miller**  
University of Louisville

**Priya Mohanraj**  
Ohio State University

**Ryan Gregory Morris**  
Auburn University

**Michael Mourelatos**  
College of Medicine, Chicago

**Kawonia Phalon Mull**  
Meharry Medical College

**Vasanthan G. Naidu**  
University of Illinois, Urbana

**Bradley Charles Nindl**  
Penn State University

**Sophia Omoro**  
Tulane University

## Moving?

If you have moved or  
changed your phone, fax  
number, or email address,  
please notify the APS office  
at

**301-530-7171**

or contact Linda Buckler at

**lbuckler@aps.faseb.org**

## MEMBERSHIP

---

**Susanne M. Pavelka**  
Oklahoma University Health Science  
Center

**Steven C. Payne**  
West Georgia College

**Yuan Bo Peng**  
University of Texas Medical Branch

**Cynthia L. Perreault-Micale**  
Brandeis University

**Ricardo Fernandez Perez**  
Universidade de Sao Paulo

**Jerome W. Peters**  
Howard University

**Tamara Susan Peters**  
University of Iowa

**Craig Frederick Plato**  
Medical College of Wisconsin

**Jason E. Podrabsky**  
University of Colorado

**Jon S. Poling**  
Georgetown Medical School

**Christopher M. Quick**  
Rutgers University

**Richard N. Rausch**  
Portland State University

**Robert A. Rebres**  
Albany Medical College

**Christopher P. Regan**  
University of Alabama, Birmingham

**Tricia A. Reichert**  
Regis University

**Walter P. Robertson**  
Tulane University School of Medicine

**Edward L. Robinson**  
University of California, Davis

**Darren M. Roesch**  
University of Florida

**James W. E. Rush**  
State University of New York

**Reena Sandhu**  
University of Toronto

**Christine Jean Saoud**  
University of Florida

**Brandon A. Sheafor**  
University of Colorado

**Weiqun Shen**  
New York Medical College

**Karen A. Schuler**  
University of Pittsburgh

**Dana Kevin Sindelar**  
Vanderbilt University Medical Center

**Mark Alan Sloan**  
University of Houston

**Michelle L. Stanton**  
Meharry Medical College

**Christina Strandgaard**  
University of California, Davis

**Kristin J. Stuempfle**  
Penn State University College of Medicine

**Caroline Sussman-Turner,**  
University of Connecticut

**John G. Swallow**  
University of Wisconsin, Madison

**Douglas Swank**  
University of Pennsylvania

**Paul Richard Territo**  
University of Nevada

**Fethi Trabelsi**  
University of Montreal

**Johnathan David Tune**  
University of N. Texas

**Matthew Walker**  
Tulane University School of Medicine

**Darren Paul Wallace**  
University of Kansas Medical Center

**Chi-Tarng Wang**  
Tulane University School of Medicine

**Jizhong Wang**  
University of Manitoba

**Yuxiang Wang**  
McMaster University

**Claude Warren**  
University of Montreal

**Jia Wei**  
University of Washington

**Scott R. Wersinger**  
Boston University

**James B. White**  
Birmingham Southern College

**Melissa Williams**  
University of Texas Health Science Center

**Brandon Wills**  
University of Colorado

**Mark Alan Wingertzahn**  
St. Johns University

**Jennifer Anne Wong**  
University of Tennessee

**Wendy Zhou**  
J.H. Miller Health Center

**Wylie Zhu**  
University of Cincinnati

**Zhenpeng Zhuang**  
University of Hawaii

**Adrienne S. Zion**  
Columbia University

**Hui Zou**  
Eastern Virginia Medical School

\* Indicates member upgrade from student

**Now on the APS Gopher  
Information Server:**

***APStracts***

*An online publication of the  
abstracts of manuscripts accept-  
ed for publication in all APS  
journals as of January 1995.*

## Bylaw Change Proposed by Council

At the Spring Council Meeting, the APS Council unanimously approved the Finance Committee's recommendation to increase the size of the committee by one person and to allow the Past President to serve as a voting member. **Franklyn G. Knox**, the Finance Committee Chair, presented the wording of the amended bylaw as follows:

**Article V. Section 2. Finance Committee.** A Finance Committee, composed of ~~three~~ four regular members of the Society appointed by Council, shall receive the total coordinated budget proposals annually from the Executive Director and shall determine the annual budgets, reserve funds and investments of the Society, subject to approval by the Council. The term of each member of the Finance Committee shall be three years; a member may not serve more than two consecutive terms. The Council shall designate the Chairman of the Committee who shall be an ex officio member of the Council, without

vote. On advice of the Finance Committee and consent of Council, the Executive Director shall be empowered to appoint and compensate a Business Manager who shall assist in carrying out the functions of the Finance Committee under the supervision of the Executive Director. The Past-President shall serve as a voting member of the Finance Committee. The President-Elect, President, Executive Director, the Chairman of the Publications Committee, and the Business Manager shall be ex officio members of the Finance Committee, without vote.

As required by the Society's bylaws, this change is being presented to the membership in writing three months prior to the Spring Business Meeting. Voting on the Bylaw change will take place on Tuesday, April 16, 1996 at the APS Business Meeting held during Experimental Biology '96 in Washington, DC.

## Volunteers Needed!

Sign up now to be a host/tour guide for high school teachers and their students who will be attending a one-day workshop at Experimental Biology '96 in Washington, DC. Volunteers are needed to guide teachers and students to poster sessions and the exhibit hall during lunch — from 11:30 a.m. to 1:40 p.m. — on Tuesday, April 16, 1996. DC area teachers and their students will be attending APS' Workshop for High School Life Sciences Teachers and Students.

This is your opportunity to encourage a budding young scientist to decide on a career in physiology and to hear about the interests and concerns of the next generation of scientists.

Box lunches will be provided for all teachers, students, and host/tour guide volunteers.

If you are interested in volunteering, please complete the form below and fax to Phyllis Edelman, APS Education Office at fax: (301) 571-8305, or call (301) 571-0692 or email: pedelman @aps.faseb.org.

### YES! I WANT TO SERVE AS A HOST/TOUR GUIDE FOR TEACHERS AND STUDENTS AT EXPERIMENTAL BIOLOGY '96!

NAME: \_\_\_\_\_  
 INSTITUTION: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
 PHONE: \_\_\_\_\_ FAX: \_\_\_\_\_  
 EMAIL: \_\_\_\_\_

MAIL TO: Phyllis Edelman, Project Coordinator  
 Frontiers in Physiology  
 APS  
 9650 Rockville Pike  
 Bethesda, MD 20814-3991  
 Fax: (301) 571-8305

1996 APS Conference  
**Neural Control of Breathing:**  
**Molecular to Organismal Perspectives**  
 July 21–25, 1996 • Madison, WI

The fundamental goal of this conference is to provide the opportunity for in-depth exchange of ideas concerning the central neural control of breathing in vertebrates. Fundamental components of this important homeostatic control system will be discussed, such as the central neural mechanisms of rhythm generation and burst pattern formation. These topics will be discussed on the molecular, cellular, synaptic, and network levels, providing the basis for mechanistic insights into system behavior expressed in intact, behaving organisms. Organismal perspectives will be derived by examining complex, integrated behaviors of the system, such as the ventilatory responses to exercise, hypoxia, hibernation, and sleep. The interplay between the respiratory control system and other physiological control systems (e.g., cardiovascular, locomotion) will also be considered. In each session, concepts will be explored using both a traditional mammalian bias and a comparative physiological perspective, exploring the advantages of unique experimental preparations for their technical and conceptual power.

Following is a preliminary program.

**Organizing Committee**

**Gordon S. Mitchell, University of Wisconsin, Madison**  
 Gerald Bisgard, University of Wisconsin, Madison; Jerome Dempsey, University of Wisconsin, Madison; Jack Feldman, University of California, Los Angeles; Marc Kaufman, University of California, Davis; Donald McCrimmon, Northwestern University, William Milsom, University of British Columbia

**Sunday, July 21**

*Registration*

*Reception*

*Meeting overview and geographic orientation*

**Gordon S. Mitchell, Madison, WI**

*The Central Neural Network—Mechanisms of Rhythm Generation*

**Eve E. Marder, Boston, MA**

**Michael S. Dekin, New Brunswick, NJ**

Naweed I. Syed, Calgary, Canada; Jack L. Feldman, Los Angeles, CA; Jan-Marino Ramirez, Göttingen, Germany; Bruce G. Lindsey, Tampa, FL; John M. Orem, Lubbock, TX

**Abstract Deadline: March 1**  
**Advance Registration Deadline: May 31**

**Monday, July 22**

*Neurochemicals in Ventilatory Control*

**David E. Millhorn, Cincinnati, OH**

Diethelm W. Richter, Göttingen, Germany; Albert J. Berger, Seattle, WA; Michael S. Dekin, New Brunswick, NJ; Maria Czyzyk-Krezeska, Cincinnati, OH; Gregory D. Funk, Auckland, New Zealand; Leszek K. Kubin, Philadelphia, PA

*Central CO<sub>2</sub>-Sensory Mechanisms*

**Peter Scheid, Bochum, Germany**

Judith A. Neubauer, New Brunswick, NJ; Eugene E. Nattie, Hanover, NH; Joseph S. Erlichman, Dayton, OH; H. V. Forster, Milwaukee, WI; Steven A. Shea, Cambridge, MA

**Tuesday, July 23**

*Integrated Ventilatory Responses: Sensory Mechanisms*

**Gerald E. Bisgard, Madison, WI**

David F. Donnelly, New Haven, CT; Gabriel G. Haddad, New Haven, CT; Tony G. Waldrop, Urbana, IL; Steven W. Mifflin, San Antonio, TX; Frank L. Powell, San Diego, CA; Eugene N. Bruce, Lexington, KY

**Wednesday, July 24**

*Phylogeny and Ontogeny in Ventilatory Control*

**Sandra J. England, New Brunswick, NJ**

Neil J. Smatresk, Arlington, TX; E.W. Taylor, Birmingham, UK; Mark A. Hanson, London, UK; Douglas A. Bayliss, Charlottesville, VA; Monique Denavit-Saubié, Gif-Sur-Yvette, France; Liming Ling, Madison, WI

*Modulation and Plasticity in Ventilatory Control*

**Gordon S. Mitchell, Madison, WI**

James C. Houk, Chicago, IL; Donald R. McCrimmon, Chicago, IL; Duncan L. Turner, Leeds, UK; Kingman P. Strohl, Cleveland, OH; Gary C. Sieck, Rochester, MN; David M. Katz, Cleveland, OH

**Thursday, July 25**

*Integrated Ventilatory Responses: Exercise and Sleep*

**Jerome A. Dempsey, Madison, WI**

Dorothy M. Ainsworth, Ithaca, NY; Dona F. Boggs, Missoula, MT; Ralph F. Fregosi, Tucson, AZ; Marc P. Kaufman, Davis, CA; Lewis Adams, London, UK; Alan I. Pack, Philadelphia, PA; William K. Milsom, Vancouver, BC, Canada

1996 APS Conference  
**pHysiology of Acid-Base Regulation:  
 From Molecules to Humans**

July 12–15, 1996 • Snowmass, CO

This conference will be unique in bringing together a range of biologists who normally do not attend pH meetings or symposia, especially together as a group. The meeting will bring a fresh and integrative perspective to the field of pH regulation.

Our understanding of the mechanisms and relevance of pH regulation is undergoing dramatic changes, brought about by improved techniques for measuring pH in vitro and in vivo, application of molecular biological techniques, and measurement of pH in nontraditional systems. In addition to including state-of-the-art advances in more traditional areas of research, also included will be two new areas of research: in vivo measurements of pH using magnetic resonance spectroscopy and the involvement of endomembrane systems (e.g., endosomes) in pH regulation.

Following is a program.

**Organizers**

**Robert J. Gillies, University of Arizona Health Science Center**

**Walter F. Boron, Yale University School of Medicine**

**Friday, July 12**

*Opening Session with Dinner*

*Overview of Conference*

**Robert Gillies, Univ. of Arizona, Tucson**

*Cell pH From a Historical Perspective*

**Albert Roos, Washington University, St. Louis, MO**

*Where Do We Go From Here?*

**David W. Deamer, University of California, Davis**

*pH Measured In Vivo*

**John Griffiths, St. Georges Hospital, London, UK**

John Griffiths, St. Georges Hospital, London, UK; Martin Kushmerick, University of Washington, Seattle; Mitch Chessler, New York University, New York; Jeff Evelhoch, Wayne State University Medical Center, Detroit, MI; Zaver Bhujwalla, Johns Hopkins Univ., Baltimore, MD

*Introduction to Cell Physiology*

**Walter F. Boron, Yale University School of Medicine, New Haven, CT**

Sergio Grinstein, Hospital for Sick Children, Toronto, Canada; George Sachs, UCLA School of Medicine, Los Angeles

**Sunday, July 14**

*Cell Physiology of pH Regulation*

**Carol Deutsch, University of Pennsylvania, Philadelphia**

Robert Gillies, University of Arizona Health Sciences Center, Tucson; Richard Vaughn-Jones, Oxford University, Oxford, UK; Walter Boron, Yale University, New Haven, CT; Carol Deutsch, University of Pennsylvania, Philadelphia; Keith Buckler, Oxford University, Oxford, UK

*What Are the Molecular Targets for Intracellular H<sup>+</sup>?*

**Robert Alpern, Univ. of Texas, Southwestern Medical School, Dallas**

**Monday, July 15**

*Regulation of pH in Subcellular Systems*

**Mike Forgac, Tufts University, Boston, MA**

Masamitsu Futai, Osaka University, Osaka, Japan; Ted Steck, University of Chicago, Chicago, IL; Mike Forgac, Tufts University, Boston, MA

*Molecular Systems*

**Carolyn Slayman, Yale University, New Haven, CT**

Roland Baron, Yale University, New Haven, CT; Jacques Pouyssegur, University of Nice, Nice, France; Ron Kopito, Stanford University, Stanford, CA; Mike Kaplan, Good Samaritan Hospital, Portland, OR; Carolyn Slayman, Yale University, New Haven, CT; Tom Stevens, University of Oregon, Eugene, OR; Steve Gluck, Washington University, St. Louis, MO

*Bookkeeping: Can We Do Better Than Back-of-the-Envelope?"*

**Robert Putnam, Wright State University, Dayton, OH**

**Abstract Deadline: March 1  
 Advance Registration Deadline: May 31**

1996 Intersociety Meeting  
**The Integrative Biology of Exercise**  
 October 16–19, 1996 • Vancouver, British Columbia

Muscular exercise in both health and disease is perhaps the most integrated of all biological functions, requiring often prolonged coordination among the central nervous, respiratory, cardiovascular, musculoskeletal, cutaneous, renal, and hormonal systems. Understanding the scientific basis of exercise therefore requires crossing interdisciplinary boundaries in ways few investigators normally achieve. To facilitate this, we propose an integrative, interdisciplinary scientific conference on muscular exercise.

In one meeting, symposia will offer integration on several fronts: from molecular to whole organism function, from health to disease, from biochemical to biophysical processes, across species, and between organs. Such depth and breadth in the scientific basis of exercise are not available through regular national or special meetings of either the APS or the American College of Sports Medicine. The need for such a meeting can be appreciated by the success of its predecessor in 1992 and the eagerness with which participants have agreed to be involved in 1996.

The backbone of the conference is a series of 12 research symposia and 3 tutorial lectures. Contributed poster presentations by attendees will be unopposed by symposia and prominently featured. Six awards will be made to graduate students presenting outstanding original research. With an aging population living longer with chronic disease as well as a national focus on wellness in part via exercise, it is ever more important to develop a sound scientific foundation for medical recommendations. This conference will contribute to this goal.

**Organizing Committee**

**Peter D. Wagner, University of California, San Diego**

Frank Booth, University of Texas Medical School; James H. Jones, University of California, Davis; Harold Laughlin, University of Missouri; Ethan R. Nadel, John B. Pierce Laboratory; Ronald Terjung, SUNY Health Sciences Center, Syracuse; Tony Waldrop, University of Illinois; David Wasserman, Vanderbilt University Medical Center

**Wednesday, October 16**

*Registration*

*Reception*

**Thursday, October 17**

*Comparative Exercise Physiology: Insights on Human Performance From Animals*

**David R. Jones, University of British Columbia**

David R. Jones, University of British Columbia; Robert J. Full, University of California, Berkeley; Richard Brill, University of Hawaii; William K. Milsom, University of British Columbia; Patrick J. Butler, University of Birmingham; James H. Jones, University of California, Davis, and Stan L. Lindstedt, Northern Arizona University

*Central Neural Control of the Cardiorespiratory System During Exercise*

**Tony G. Waldrop, University of Illinois**

Tony G. Waldrop, University of Illinois; Marc P. Kaufman, University of California at Davis; L. Britt Wilson, University of South Alabama School of Medicine; Gary A. Iwamoto, University of Illinois; Lewis Adams, Charing Cross and Westminster Medical School; Edgar Garcia-Rill, University of Arkansas for Medical Sciences

*Plasticity of Muscle*

**Susan Kandarian, PhD, Boston University**

Brenda Russell, University of Illinois at Chicago; Donald B. Thomason, University of Tennessee Health Science Center; Karyn Esser, University of Illinois Chicago; James A. Carson, University of Texas Health Science Center, Houston; Richard W. Tsika, University of Illinois Urbana-Champaign

*Regulation of Glucose Utilization by Working Muscle*

**John L. Ivy, University of Texas, Austin**

John L. Ivy, University of Texas, Austin; Laurie J. Goodyear, Harvard Medical School; Arend Bonen, University of Waterloo, Ontario, Canada; David H. Wasserman, Vanderbilt University School of Medicine; Alain D. Baron, University of Indiana School of Medicine; John L. Ivy, University of Texas, Austin

*Hyperventilatory Response to Heavy Exercise: Causes and Consequences*

Jerome L. Dempsey, John Rankin Laboratory of Pulmonary Medicine, University of Wisconsin, Madison

*Magnetic Resonance Approaches in Exercise Physiology*

Robert Balaban, Laboratory of Cardiac Energetics, NHLBI, Bethesda



**Friday, October 18**

*Linking Muscle Mechanics and Energetics: From Cross-Bridge to Locomotion*

**Kevin E. Conley, University of Washington, and Stan L. Lindstedt, Northern Arizona University**

Kevin E. Conley, University of Washington; Earl Homsher, University of California, Los Angeles; Thomas L. Daniel, University of Washington; Martin J. Kushmerick, University of Washington; Lawrence C. Rome, University of Pennsylvania; Stan L. Lindstedt, Northern Arizona University

*Cardiovascular Plasticity/Exercise*

**M. Harold Laughlin, University of Missouri**

Russell L. Moore, University of Colorado; Charlotte A. Tate, University of Houston; Leslie Leinwand, University of Colorado, Boulder; Julia M. Lash, Indiana University School of Medicine; Thomas H. Hintze, New York Medical College

*Force Modulation in Skeletal Muscle: Molecules to Motor Units*

**Brian R. MacIntosh, University of Calgary, and Jean-Marc Renaud, University of Ottawa**

David G. Allen, University of Sydney; H. Lee Sweeney, Pennsylvania State University; Brian R. MacIntosh, University of Calgary; Jean-Marc Renaud, University of Ottawa; Carlo J. de Luca, Boston University; Phillip F. Gardiner, University of Montreal

*Adaptations in Body Fluid Regulation to Physical Activity*

**Ethan R. Nadel, John B. Pierce Laboratory and Yale University School of Medicine**

Ethan Nadel, John B. Pierce Laboratory and Yale University School of Medicine; Sheldon Weinbaum, City University of New York; Phil Watson, University of South Carolina Medical School; Hiroshi Nose, Kyoto Prefectural University School of Medicine; Gary W. Mack, John B. Pierce Laboratory; Peter D. Wagner, University of California, San Diego

*Molecular Approaches in Exercise Physiology*

**Frank Booth, University of Texas, Houston**

**Saturday, October 19**

*Anabolic Effect of Exercise: A Systems Approach*

**Dan M. Cooper, Harbor-UCLA Medical Center**

Dan M. Cooper, Harbor-UCLA Medical Center; Charles T. Roberts, Jr., Oregon Health Sciences University; Subburaman Mohan, Loma Linda University Medical School; Gabriel Haddad, Yale University School of Medicine; Giuseppe A. Hardi, California Institute of

Technology; Frank Booth, University of Texas, Houston

*Fatigue*

**Robert Fitts, Marquette University**

Robert Fitts, Marquette University; Roger Enoka, Cleveland Clinic Foundation; Jack K. Barclay, University of Guelph; A. Wagenmaker; Robert B. Godt, Medical College of Georgia

*Vascular Remodeling: Angiogenic Growth Factors, Ischemia, and Exercise*

**Ronald Terjung, SUNY Health Science Center Syracuse**

Olga Hudlicka, University of Birmingham School of Medicine, England; P.A. D'Amore, Children's Hospital, Boston; Ellis F. Unger, Cardiology Branch, NHLBI; Jeffrey M. Isner, Tufts University School of Medicine, Boston; Ronald Terjung, SUNY Health Science Center Syracuse

*Muscle Use and Overuse*

**Brenda Russell, University of Illinois at Chicago**

Robert B. Armstrong, Texas A&M University; Roger A. Fielding, Tufts University; Richard Lieber, University of California, San Diego; M. Jackson; Susan C. Kandarian, Boston University

**An invitation to submit  
proposals to the  
1997 FASEB Summer  
Research Conferences**

**Saxtons River, Vermont  
Snowmass Village, Colorado**

◆ **Deadline: January 10, 1996** ◆

To obtain a copy of the guidelines for submitting a proposal, please contact:

**FASEB Summer Research Conferences  
9650 Rockville Pike  
Bethesda, MD 20814-3998  
tel: 301-530-7093 fax: 301-571-0650  
Email: src@faseb.org**

## Experimental Biology '96

April 14-17, 1996 • Washington, DC

### Symposia

From receptor to response: brain stem cholinergic mechanisms of autonomic control

*Helen A. Baghdoyan*

Neurogenic mechanisms of long-term arterial pressure regulation: beyond the baroreceptor reflex

*John W. Osborn*

The role of ras in the transmission of growth and developmental signals

*Deborah K. Morrison*

Intracellular calcium communication

*Michael L. Woodruff*

Oxidants and thiol redox control in the gastrointestinal tract

*Tak Yee Aw & Dean P. Jones*

Role of nitric oxide in the physiology and pathophysiology of the digestive system

*Matthew B. Grisham*

Signaling mechanisms and genes involved in the development of cell hypertrophy

*Patricia Preisig*

Fatigue and endurance capacity of respiratory muscles: emerging concepts

*Ralph F. Fregosi*

Lung inflammation: cells, secretory products and signaling mechanisms

*James D. Crapo*

Molecular targets of vascular disease

*David L. Crandall*

Comparative aspects of membrane transport: functional variation within common paradigms

*Gregory Ahearn*

The kidney as a target organ for growth hormone

*Aviad Haramati*

The single smooth muscle cell: 25th anniversary

*Roland M. Bagby & Frederick S. Fay*

Nitric oxide and the functions of juxtaglomerular apparatus

*Ian A. Reid & Ronald H. Freeman*

Epithelial issues

*Sandy I. Helman*

Mechanisms of angiogenesis

*Kathryn G. Lamping*

Structural and functional characteristics of juxtaglomerular cells

*Jurgen B. Schnermann*

Potassium channels and blood vessels

*Donald D. Heistad*

Effects of growth hormone excess in transgenic mice

*Andrzej Bartke*

Cell-matrix interactions in lung development

*Robert M. Senior & Jesse Roman*

APS Past Presidents' Symposium: Intercellular signaling in the vascular wall

*Brian R. Duling*

### Workshops

Refresher course for teaching of gastrointestinal physiology

*Norman Weisbrodt*

Methods for evaluating higher order learning

*Roger Thies*

### Biomedical Engineering Society

Adhesion biomechanics: molecular, cellular and biomechanical aspects of cell adhesion

*K.-L. Paul Sung*

Transport of peptides and proteins

*Cynthia Sung*

New approaches to membrane potential studies using voltage-sensitive dyes

*James M. Beach*

### North American Society of Biorheology

Gene regulation by mechanical force in mammalian cells

*Larry V. McIntire*

### Society for Experimental Biology and Medicine

Role of natriuretic peptides in body fluid homeostasis

*Samuel M. McCann*

## Submissions to the *Journal of Applied Physiology*

When submitting a manuscript to the *Journal of Applied Physiology*, please include the manuscript on disk to enable the APS Editorial Office to electronically transmit the manuscript to the editor for facilitation of the review process.

# Experimental Biology '96

April 14-17 • Washington, DC



1996 HENRY PICKERING BOWDITCH AWARD

Kim E. Barrett  
University of California,  
San Diego

*Intra- and Intercellular Regulation of Intestinal  
Epithelial Transport*



1996 WALTER B. CANNON MEMORIAL AWARD

Richard W. Tsien  
Stanford University

*Calcium Channels as Versatile  
and Efficient Signal Transducers*

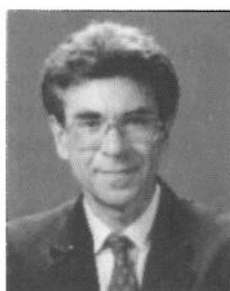
## Distinguished Lectureships



ROBERT M. BERNE  
DISTINGUISHED  
LECTURESHP OF THE  
CARDIOVASCULAR  
SECTION

Richard J. Traystman  
Johns Hopkins  
University

*Brain Protection:  
Lessons  
From the Animal Farm*



SOLOMON A. BERSON  
DISTINGUISHED  
LECTURESHP  
OF THE ENDOCRINOLOGY  
AND METABOLISM  
SECTION

Robert J. Lefkowitz  
Duke University

*G Protein-Coupled  
Receptors and Receptor  
Kinases: From  
Molecular Biology to  
Potential Therapeutic  
Applications*



EDWARD F. ADOLPH  
DISTINGUISHED  
LECTURESHP  
OF THE ENVIRONMENTAL  
AND EXERCISE  
PHYSIOLOGY SECTION

John T. Reeves  
University of Colorado

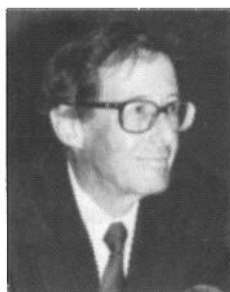
*Pulmonary Circulation  
During Exercise at Sea  
Level and High  
Altitude*



JOSEPH ERLANGER  
DISTINGUISHED  
LECTURESHP  
OF THE CENTRAL  
NERVOUS  
SYSTEM SECTION

J. Allan Hobson  
Harvard Medical  
School

*Waking, Sleeping,  
and Dreaming:  
The Neurobiological  
Control of Conscious  
States*



HORACE DAVENPORT  
DISTINGUISHED  
LECTURESHP  
OF THE  
GASTROINTESTINAL  
SECTION

Alan F. Hofmann  
University of  
California, San Diego

*The ABCDs of Bile  
Acids and the  
Enterhepatic  
Circulation*



CARL LUDWIG  
DISTINGUISHED  
LECTURESHP  
OF THE NEURAL  
CONTROL  
AND AUTONOMIC  
REGULATION SECTION

Diana L. Kunze  
Rammelkamp Center

*Neural Integration  
of Cardiovascular  
Reflexes:  
A View From the Cell*



HUGH DAYSON  
DISTINGUISHED  
LECTURESHP  
OF THE CELL AND  
GENERAL PHYSIOLOGY  
SECTION

Günter Blobel  
Rockefeller University

*Protein Translocation  
Across Membranes*



CARL W. GOTTSCHALK  
DISTINGUISHED  
LECTURESHP OF THE  
RENAL PHYSIOLOGY  
SECTION

Mark A. Knepper  
National Heart, Lung,  
and Blood Institute

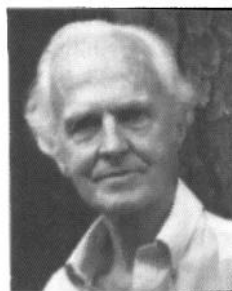
*Mechanisms of  
Vasopressin Action in  
the Kidney*



JULIUS H. COMROE, JR.  
DISTINGUISHED  
LECTURESHP  
OF THE RESPIRATION  
SECTION

Marlene Rabinovitch  
Hospital for Sick  
Children, Toronto

*Endogenous Vascular  
Elastase and Beyond:  
Retro and  
Pro-Spectroscopic  
Insights*



AUGUST KROGH  
DISTINGUISHED  
LECTURESHP  
OF THE COMPARATIVE  
PHYSIOLOGY SECTION

Knut Schmidt-Nielsen  
Duke University

*Life at the Edge:  
Survival in Hostile  
Environments*



CLAUDE BERNARD  
DISTINGUISHED  
LECTURESHP  
OF THE TEACHING OF  
PHYSIOLOGY SECTION

Stanley G. Schultz  
University of Texas,  
Houston

*Homeostasis, Humpty-  
Dumpty, and  
Integrative Biology*



ERNEST H. STARLING  
DISTINGUISHED  
LECTURESHP  
OF THE WATER AND  
ELECTROLYTE  
HOMEOSTASIS SECTION

Allen W. Cowley, Jr.  
Medical College of  
Wisconsin

*Role of Renal Medulla  
in Volume and Arterial  
Pressure Regulation*

For information, contact the Office of Scientific Meetings and Conferences (301-530-7010)

## APS Urges AirFrance to Continue Shipping Primates

Air France should continue to ship nonhuman primates between France and the US for biomedical research, the APS told Air France in a recent letter.

"I was deeply disturbed to hear that Air France is being subjected to pressure from extreme animal activists to curtail its present policy of providing safe and humane transport for research primates between our two countries," APS Executive Director Martin Frank wrote in an October 20 letter to Air France President Christian Blanc.

Air France has been under pressure from the British Union Against Vivisection to halt air shipment of research primates ever since the German airline Lufthansa announced in May that it would halt such shipments. Animal activist groups have claimed in letters to Air France that as many as 10-15% of all US-bound research primates die en route or during the one-month quarantine period.

However, the Quarantine Division of the US Centers for Disease Control has refuted those accusations. In a letter to

Air France, the CDC reported that between October 1991 and June 1995, less than 1% of the 29,000 nonhuman primates imported into the US died during shipment and the subsequent 31-day quarantine period. Furthermore, approximately half of those animal deaths occurred as a result of a single incident involving an airplane with mechanical problems. Apart from that incident, less than one half of one percent of the primates shipped died in transit or shortly thereafter, a far cry from the "10-15%" mortality rate claimed by activists.

"The vast majority of people recognize that it is essential to use research animals as models of the human system in order to understand diseases and to try new drugs and therapies," Frank wrote to Air France President Blanc. "I must state in the strongest possible terms that the carefully supervised and humane use of research animals *is* the ethical choice."

APS also wrote letters in support of continued Air France transport of research primates to the French Minister of Public Health and the Secretary of State for Research.

## ORI Reports Researcher's Exoneration

For the first time, the Public Health Service's Office of Research Integrity has published a notice about an investigation that did not result in a misconduct finding. The action was taken "at the request of the respondent to assist in the restoration of his reputation," according to an article in the September 1995 issue of *ORI Newsletter*. The notice was also published in the *Federal Register* and in the *NIH Guide for Grants and Contracts*.

The case involved David Plotkin, MD, of the Memorial Cancer Research Foundation (MCRF) of Southern California, a principal investigator with the University of Pittsburgh's National Surgical Adjuvant Breast and Bowel Project (NSABP). ORI investigated allegations that clinical trial data forms submitted by MCRF contained falsified and fabricated information.

In April 1994, the *Chicago Tribune* obtained a copy of a four-year-old audit report about the breast and bowel cancer

project that stated that there was a "serious problem with respect to the accuracy" of the data reported by MCRF. The *Chicago Tribune* reporter reviewed some records on subjects entered into the NSABP clinical trials and found apparent discrepancies between reported data and the medical records. Much of the data in question related to the clinical trial of breast cancer treatments that compared lumpectomy with or without radiation therapy to total mastectomy.

In its notice, ORI reported that it had reviewed records and data on 59 patients reported to the NSABP between 1973 and 1994 and "did not find falsification, fabrication, or deliberate misrepresentation on the part of Dr. Plotkin or his staff." Rather, ORI found that "Many of the discrepancies originally identified by the NSABP and the *Chicago Tribune* were the result of a review of incomplete records, honest error on the part of one or more of the participating parties, or differences in interpretations or judgments of the facts."

## House Endorses "Scientific Opportunities" for Funding

The House Appropriations Committee acknowledged the importance of "scientific opportunity" in the report that accompanied this year's Labor-HHS-Education funding bill. Rep. John Porter (R-IL) is the chairman of the Labor-HHS-Education subcommittee, which drafted the report and recommended a 5.7% increase for NIH in FY 1996.

"The [House Appropriations] Committee believes that NIH should allocate the funding provided on the basis of scientific opportunity," the report stated. Although "other factors" may be relevant, the report expressed concern about making funding allocations along lines other than scientific merit.

"The Committee wants to avoid endorsing any methodology that could be characterized as focusing on the 'disease of the month,' the panel wrote. It added that NIH's "flexibility to fund promising research on the basis of scientific opportunity" should be given credit for advances made in research on Parkinsons and Alzheimer's.

"To enhance NIH's flexibility to allocate funding based on scientific opportunity," the report went on, "the Committee has attempted to minimize the amount of direction provided in the report accompanying the bill," although disease areas of interest to Members of Congress were highlighted.

## Physiology Leads in Medical School Animal Labs

Physiology classes are the largest single category of required medical school courses involving the use of live animals, according to the results of a survey by the Association of American Medical Colleges (AAMC).

The AAMC conducted a survey in 1994 of the 126 US medical schools. Of the 125 schools that responded, 49 were using live animals in required physiology courses. Twenty-one schools used animals in surgical clerkships, and 13 used them in pharmacology courses.

The survey did not distinguish between demonstrations by instructors and hands-on exercises by students.

Despite the best efforts in recent years by animal activist organizations such as the Physicians Committee for Responsible Medicine (PCRM) to portray the use of live animals in medical school courses as a backward practice, most schools continue to see these labs as a valuable teaching tool.

The results of the AAMC survey were published in an article by Stanley Ammons in the August 1995 issue of *Academic Medicine* ("Use of Live Animals in the Curricula of U.S. Medical Schools in 1994"). The survey found that overall 77 of the 125 responding schools use animals in one or more courses. That represents a decrease since 1992, when 92 of the 126 medical schools indicated that they use live animal laboratories in their regular curricula.

However, the reasons for discontinuing live animal laboratories were quite different from the ones that the PCRM tries

to portray. The AAMC survey specifically asked medical schools that had discontinued the use of live animals to indicate when this decision was made and the reasons why it was made.

The survey results indicated that there has been a steady decline in the number of schools using live animals since the early 1980s; the most frequently reported reason for discontinuing live-animal use (cited by 18 institutions) was the

expense of the labs. Other institutions cited changes in curriculum or curriculum focus, the compression of student time spent in courses, lack

of sufficient skilled faculty or teaching assistants, the availability of computer-assisted programs and videos, and lack of teaching space.

Only four schools said that they found live-animal laboratories less effective than other approaches such as computer simulations, videotapes, or library study. Another four attributed their decisions to "students' concern."

Thus it would seem that live-animal laboratories still retain broad acceptance as a teaching tool, even though there is stiff competition for money, time, and space that makes it difficult for some schools to continue the practice. The article concluded that "for those schools that have sufficient human, financial, and physical resources, the data suggest that the use of live animals in laboratories will probably continue to be seen as providing valuable learning experiences."

### Most schools continue to see these labs as a valuable teaching tool.

## NIH Budget Outcome Remains Uncertain

At the time of this writing, the outcome of the FY 1996 budget battle still remains in doubt. On Monday, November 20, federal agencies opened again after the President and the Congress reached agreement in principle on another temporary spending measure, having approved a one-day continuing resolution to give them time to work out the details on a measure to keep the government running till December 15.

The agreement ended a six-day government shutdown during which time only "essential" functions could be conducted at government agencies whose regular appropriations bills had not been approved. NIH was one of the agencies affected. The new agreement, which permits those agencies to carry on their work while Congress tries to pass their regular appropriations bills, provides the NIH with the same level of funding it received in FY 1995.

NIH had operated on a continuing resolution providing only 95% of its FY 1995 level from October 1 — the start of the new fiscal year — until November 13 when the first continuing resolution ran out. Agencies without regular appropriations were shut down at midnight on November 13 after President Clinton vetoed a three-week extension of the continuing resolution because he and Republican congressional leaders had not agreed on budget and policy issues.

The funding impasse complicates an already difficult situation for NIH. Even though the White House and Congress are on the way to working out a compromise over the larger issues, NIH's FY 1996 budget level remains an unknown because the Senate has not yet acted on the Labor-HHS-Education funding bill.

In August, the House of Representatives, at the behest of Rep. John Porter, R-IL, who chairs the House Appropriations Subcommittee on Labor-HHS-Education, approved a 5.7% funding increase for NIH. In September the corresponding Senate Appropriations subcommittee provided NIH with a 2.7% increase. Rep. Porter made clear that he would do his best to secure NIH the larger number when the bill came to conference. However, the Senate bill never reached the Senate floor because of disagreements over several controversial legislative riders attached to it. Until the Senate takes further action to permit the bill to go to conference, the NIH's funding level cannot be finalized.

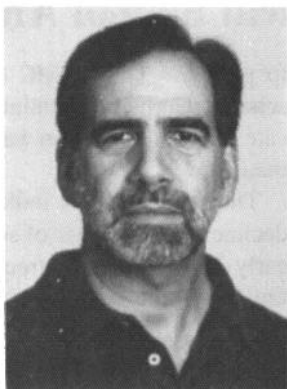
Furthermore, it is also uncertain whether the difference between the funds provided under the continuing resolutions and NIH's eventual FY 1996 funding level will be restored to the agency. Any such shortfall would effectively reduce the FY 1996 budget level.

## Introducing ... Peter L. Strick

Peter L. Strick, VA Research Career Scientist and Professor in the Departments of Neurosurgery and Physiology at the SUNY Health Science Center at Syracuse, was appointed Editor of the *Journal of Neurophysiology* on July 1, 1995. He has been an Associate Editor of the journal since 1986.

Strick was born in Philadelphia, PA and received his BA in Biology from the University of Pennsylvania in 1968. He entered the graduate program there and earned his PhD in 1972. Peter Hand, Peter Sterling, and William W. Chambers were his graduate school advisors.

After his graduate training, Strick was a Staff Fellow (1972-1974) and Senior Staff Fellow (1974-1976) with Edward V. Evarts in the Laboratory of Neurophysiology at the National



Institute of Mental Health. In 1976, he was appointed as a staff neurophysiologist at the Veterans Administration Medical Center and an Assistant Professor in the Departments of Neurosurgery and Physiology at SUNY Health Science Center in Syracuse. In 1979, he was promoted to Associate Professor and in 1982 to full Professor. Strick was promoted to Associate Research Career Scientist by the VA in 1982 and to Research Career Scientist in 1987. The Neurosurgery Department at the SUNY Health Science Center awarded Strick its George W. Perkins, III Memorial Professorship in 1988.

Strick has used a multidisciplinary approach in his research to examine the central control of voluntary movement. Most recently, he has employed transneuronal transport of neurotropic viruses to define basal ganglia and cerebellar loops with motor and nonmotor areas of the cerebral cortex. He has also used neurophysiological and imaging techniques to explore the function of these circuits.

The society is confident that the journal, under the editorship of Peter Strick, will maintain its reputation for publishing the best research in the field of neurophysiology.

## Animal Research Information On-Line

The Foundation for Biomedical Research (FBR) has established a web site. The FBR homepage provides on-line presentations of several excellent FBR resources, such as a set of frequently asked questions about animal research. It also includes colorful images of several recently published FBR advertisements that are also available as posters and fact sheets on how research using various animal species has contributed to our understanding of human and animal health problems.

The FBR homepage is located at <http://www.fiesta.com/FBR> and is a good resource to keep in mind for further reference. FBR's sister organization, the National Association for Biomedical Research (NABR), also has a web presence at <http://www.fiesta.com/NABR>.

## Workshop: Working Safely With Research Animals

The NIH Office for Protection From Research Risks is sponsoring workshops on implementing the Public Health Service Policy on Humane Care and Use of Laboratory Animals. The workshops are open to institutional administrators, members of Animal Care and Use Committees, investigators, and other institutional staff responsible for animal care and use. The next workshop will be the Fourth National Symposium on Biosafety, "Working Safely With Research Animals."

The workshop is scheduled for January 27-31, 1996. It will be held at the Westin Peachtree Plaza; 210 Peachtree Street, NW; Atlanta, GA 30303 (Tel: 404-659-1400; Fax: 404-589-7424). The registration fee is \$350.

### For registration information, contact:

Norma Drake  
Fourth National Symposium on Biosafety  
c/o Exposition and Meeting Concepts (EMC)  
PO Box 250381  
Atlanta, GA 30325-0381  
Phone: (404) 355 4884  
Fax: (404) 355 6765



## APS Members Elected to the Institute of Medicine

On October 16, 55 new members were elected to the Institute of Medicine (IOM), raising the total active membership to 519. In addition, five were honored by direct election to senior membership, bringing that roll to a total of 559. Foreign associates, a category established seven years ago, now total 41 with the election of four this year.

New members are elected by current active members from among candidates chosen for their major contributions to health and medicine or to related fields such as social and behavioral sciences, law, administration, and economics. Election to the Institute is both an honor and obligation to work on behalf of the organization, its governance, and its studies. With their election, members make a commitment to devote a significant amount of volunteer time on committees engaged in a broad range of studies on health policy issues.

### Newly elected APS members of the Institute are:

**Janice E.G. Douglas, MD**, Professor of Medicine and Director, Division of Hypertension, Case Western Reserve University School of Medicine, Cleveland, OH.

**Sid Gilman, MD**, Professor and Chair, Department of Neurology, University of Michigan, Ann Arbor.

**Lazar J. Greenfield, MD**, Frederick A. Collier Professor and Chair, Department of Surgery, Taubman Health Care Center, University of Michigan, Ann Arbor.

**James S. Lieberman, MD**, H.K. Corning Professor and Chair, Department of Rehabilitation Medicine, College of Physicians and Surgeons of Columbia University, New York City.

**Mark C. Rogers, MD**, R.J. Reynolds Professor and Vice Chancellor for Health Affairs, Duke University Medical Center; and Executive Director and Chief Executive Officer, Duke University Hospital and Health Network, Durham, NC.

**Roger Y. Tsien, PhD**, Investigator, Howard Hughes Medical Institute and Professor of Chemistry and Pharmacology, School of Medicine, University of California, San Diego.

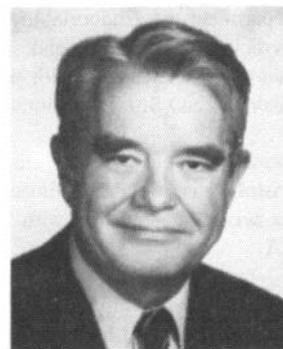
### The following APS member was elected directly to senior membership:

**Ernst Knobil, PhD**, Ashbel Smith Professor and the H. Wayne Hightower Professor in the Medical Sciences, Laboratory for Neuroendocrinology, University of Texas Health Sciences Center at Houston.

The APS extends its congratulations to all those elected to the Institute of Medicine.

## Ganong Receives Lifetime Achievement Award

The Council for High Blood Pressure Research has presented the Sixth Lifetime Achievement award to APS member **William F. Ganong**. Among his many accomplishments, Dr. Ganong was a Research Fellow in Medicine and Surgery and Director of the Surgical Research Laboratory at Harvard University. He was also chairman of the Department of Physiology at the University of California in San Francisco. In addition, he has received many awards from various universities around the world.



Ganong has made many contributions to the field of hypertension research. His accomplishments include the elucidation of the mechanisms regulating aldosterone secretion and regulation of renin secretion (particularly neural control), and the role of angiotensin in the brain and the extravascular renin-angiotensin system.

Ganong's highly respected *Review of Medical Physiology* was written in 1963 and is now in its 17th printing. As well as being the 50th APS President and serving as a member of Council, Ganong was active in the Endocrinology and Metabolism Section. He was also a member of many APS Committees, including Handbook Advisory and Publications Committees, and on the editorial boards of the *American Journal of Physiology* and the *Journal of Applied Physiology*.

## APS Members Honored

The late **A. Pharo Gage** was inducted into the the American Society for Health, Research and Environment Hall of Fame at the ASHRAE Annual Meeting in San Diego, California. The award was accepted by his daughters at a ceremony held on Saturday, June 24, 1995.

Gage was a staff member at the Pierce Laboratory and Professor of Epidemiology at Yale University School of Medicine for more than 30 years. He introduced many of the concepts, terms, and units that are now standard when characterizing human responses to the environment, and his work significantly advanced the understanding of human thermoregulation and comfort. Gage published 125 articles and book chapters and received numerous awards over the years.

APS member **Elanor Adair** has been elected to membership in the Connecticut Academy of Arts and Sciences, the third oldest learned society in the United States, having been chartered in 1799. Adair is a staff member of the John B. Pierce Laboratory.



## People and Places

**Saad Al-Damluji** has recently accepted a position with the Department of Endocrinology, Royal Free Hospital School of Medicine, London, England. Prior to accepting this position, Al-Damluji was affiliated with the National Institute of Neurological Disorders and Stroke, National Institutes of Health, Bethesda, MD.

Formerly employed with the Department of Metabolic Diseases, Bristol-Myers Squibb Institute, Princeton, NJ, **Cynthia M. Arbeen**y has accepted a position with Sepracor Pharmaceuticals, Marlboro, MA.

Now affiliated with the Department of Psychiatry/Biobehavioral Sciences, UCLA, Los Angeles, CA, **James B. Boone** was formerly with the Department of Veterinary Biomedical Science, University of Missouri, Columbia, MO.

**William F. Brechue** has joined the Department of Kinesiology, Indiana University, Bloomington, IN. Prior to his new position, Brechue was a member of the Department of Exercise & Science, University of Florida, Gainesville, FL.

**Chu Chen** is now with the Department of Otorhinolaryngology, Louisiana State University Medical Center, New Orleans. Before Chen's new appointment, he was with the Department of Physiology, Tulane University Medical Center, New Orleans, Louisiana.

Having moved from the Department of Physiology, Louisiana State University, Shreveport, LA, **Qi Chen** has accepted a position with the Department of Medical Biochemistry, Ohio State University, Columbus, OH.

**David L. Crandall** has joined Wyeth-Ayerst Research Laboratories in the Department of Cardiovascular Metabolic Disease Research, Princeton, NJ. Crandall had previously worked with the Cardiovascular Research Labs, Lederle Labs, Pearl River, NY.

Accepting a position with the Department of Pharmacology, **Deborah H. Damon** is currently with the University of Vermont, Burlington, VT. Damon was previously employed by the Department of Pharmacology, University of Texas Health Science Center, San Antonio, TX.

Now located at the Lake Erie College of Osteopathic Medicine, Erie, PA, **Russell T. Dowell** has left the Tobacco & Health Research Institute, Lexington, KY.

**Elizabeth D. Dunlap** is currently with the Milk Specialties Company, Dundee, IL. Dunlap was previously employed by the Baxter Healthcare Corporation, Round Lake, IL.

**Stephen J. Elliott** has accepted a position as Associate Professor of Physiology and Pediatrics at the Cardiovascular Research Center, Medical College of Wisconsin. Prior to his new position, Elliott was with Baylor College of Medicine, Houston, TX.

Formerly with the National Jewish Center, Denver, Colorado, **Gary T. Ferguson** has accepted an assignment with the Pulmonary/Critical Care Medicine of Harper Hospital, Detroit, MI.

**James Kevin Foskett** is now affiliated with the Institute for Human Gene Therapy, University of Pennsylvania, Philadelphia, PA. Foskett recently moved from the Division of Cell Biology, Hospital for Sick Children, Toronto, Ontario, Canada.

Moving from the Department of Physiology, University of North Texas Health Science Center, **Zhiping Gao** is now affiliated with the Department of Radiology, Johns Hopkins University School of Medicine, Baltimore, MD.

**Craig Gatto** has joined the Biochemistry Department of the Oregon Health Sciences University, Portland, OR. Before his new assignment, Gatto was associated with the Physiology Department, University of Missouri, Columbia, MO.

Having accepted a position with the Department of Chemistry & Biochemistry Engineering, **Steven C. George** is now with the University of California, Irvine, CA. Prior to his new position, George was affiliated with the University of Washington, Seattle, WA.

Having accepted a position with The Upjohn Company, Kalamazoo, MI, **Rosalia Sanchez Gonzales** has moved from the Georgia Institute of Technology, Atlanta, GA.

**Luc Edward Gosselin** has accepted a position with the Department of Physical Therapy and Exercise Science, SUNY at Buffalo, NY. Prior to his new assignment, Gosselin was associated with the Department of Anesthesia Research, Mayo Clinic, Rochester, MN.

**Jeffrey R. Henegar** has accepted a position with the College of Veterinary Medicine, Auburn University, Auburn, AL. Henegar was formerly with the University of Missouri, Columbia, MO.

**Kun-Lun Huang** was formerly associated with the Department of Physiology, University of Hawaii at Nanao, Honolulu, HI. Recently, Huang accepted a position with the Undersea Hyperbaric Medical Institute, Taipei, Taiwan, ROC.

**Rachel A. Hunt** is now employed with Geisinger Clinic, Weiss Center for Research, Danville, PA. Previous to her new assignment, Hunt was affiliated with the Department of Psychology, University of Alabama at Birmingham, Birmingham, AL.

**Richard Kinkead** moved from the Department of Zoology, University of British Columbia, Vancouver, BC, Canada, to the Department of Comparative Biosciences, University of Madison, School of Veterinary Medicine, Madison, WI.

Moving from Japan to England, **Hisao Kondo** has accepted a position with the Imperial Cancer Research Fund in the Cell Biology Laboratory, London, UK. In Japan, Kondo was affiliated with the Department of Hygiene, Kyoto University Faculty of Medicine.

Previously employed by the University of Florida College of Medicine, Gainesville, FL, **Bruce Kone** is now employed by the University of Texas, Houston, TX.

The University of California, San Diego, La Jolla, CA, has appointed **Allan M. Lefer**, to the Institute for Biomedical Engineering, University of California, San Diego. Prior to his new position, Lefer was with the Department of Physiology, Medical College, Philadelphia, PA.

**Maureen P. Malee** has left the Department of OB/GYN Maternal Fetal Medicine, University of Pennsylvania, Philadelphia, PA, to join the Women & Infants Hospital, Providence, RI

Formerly, **Samuel McCann** was Professor and Chairman of the Physiology Department, University of Texas, Southwestern Medical School, Dallas, TX. Recently, McCann has accepted a new position with the Pennington Biomedical Research Center, Baton Rouge, LA.

Recently joining the Digestive Disease Research Center, Los Angeles, California, is **James A. McRoberts**, who comes from the Department of Medicine, Harbor-UCLA Medical Center, Torrance, CA.

**Peter James O'Brien** moved from the Department of Pathology, University of Guelph, Guelph, Ontario, to Cincinnati, OH, where he joined The Miami Valley Laboratories, of The Procter and Gamble Company.

Formerly associated with the Department of Physiology, Medical College of Wisconsin, Milwaukee, WI, **Patricia J. Ohtake** has accepted a position with the Department of Physical Therapy & Exercise Science, SUNY at Buffalo, NY.

**Thomas L. Pallone** is now affiliated with the Division of Nephrology, University of Maryland School of Medicine, Baltimore, MD. Prior to his new position, Pallone was affiliated with the Division of Nephrology, Milton S. Hershey Medical Center, Hershey, PA.

Moving from the Department of Cell and Molecular Physiology, Yale University School of Medicine, New Haven, CT, **John A. Payne** is presently with the Department of Human Physiology, School of Medicine, University of California, Davis, CA.

**Daniel M. Philbin** has accepted a position with the Department of Anesthesiology, Massachusetts General Hospital, Boston, MA. Philbin was previously affiliated with the Department of Anesthesiology, University of Massachusetts Medical Center, Worcester, MA.

Currently associated with the Department of Anatomy and Physiology, **David C. Poole** is now with Kansas State University, Manhattan, KS. Prior to Kansas, Poole was with the Department of Medicine, University of California, San Diego, CA.

Leaving the Department of Physiology & Cell Biology, University of Texas Medical School, Houston, TX, **Carolyn Louise Preston** has relocated to Boston, MA, having accepted a position with The Children's Hospital.

Moving from the Department of Biological Science, Northern Arizona University, Flagstaff, AZ, **David J. Prior** is now associated with the College of Graduate Studies, Northern Michigan University, Marquette, MI.

**Rudravajhala Ravindra** has joined Endocrine Research, Veterans Administration Medical Center, North Chicago, IL. Prior to his new position, Ravindra was with the Department of Cell Biology, University of Medicine and Dentistry, Stratford, NJ.

Formerly with the Department of Physiology, University Central Del Caribe, Bayamon, PR, **Guido E. Santacana** has moved to the Department of Physiology, Professor and Chair, Ponce School of Medicine, Ponce, PR.

**William Q. Sargent** has recently accepted a position with Lorex Pharmaceuticals, Chicago, IL. Sargent was previously affiliated with Hoechst-Roussel Pharmaceutical, Somerville, NJ.

Moving from the Department of Psychology, University of Tennessee, Knoxville, TN, **Shenggang Li** has accepted a position with the Department of Physiology, University of Kentucky Medical Center, Lexington, KY.

**Erik Pierre Silldorff** has accepted a position with the College of Medicine, University Hospital, Childrens Hospital, Milton S. Hershey Medical Center, Hershey, PA. Prior to his new position, Silldorff was associated with the School of Life & Health Sciences, University of Delaware, Newark, DE.

Formerly with the Division of Cardiovascular Medicine, University of California, Davis, **Irene C. Solomon** has accepted a position with the Division of Pulmonary Medicine, Robert Wood Johnson Medical School, New Brunswick, NJ.

Recently, **Daniel Jeremy Spergel** left the National Institutes of Health, Bethesda, MD, to accept a position with the Center for Molecular Biology, University of Heidelberg, Heidelberg, Germany.

**Hidekazu Suzuki** has accepted a position with the Division of Gastroenterology, Department of Internal Medicine, Keio University School of Medicine, Tokyo, Japan. Prior to his new assignment, Suzuki was with the Institute of Biomedical Engineering, University of California, San Diego, La Jolla, CA.

Having accepted a new post with the United States Army Research & Material Command, Ft. Detrick, Frederick, MD, **Patricia C. Szlyk-Modrow** has moved from the United States Army Research Institute and Environmental Medicine, Natick, MA.

**Geert Tangelder** has moved from the Department of Physiology, University of Limburg, Maastricht, Netherlands, to the Department of Physiology, Free University, Amsterdam, Netherlands.

**Terrie M. Williams** has recently moved from the NOSC Hawaii Laboratory, Kailua, HI, and has accepted a position with the Department of Biology, University of California, Santa Cruz, CA.

## Gopher

### The American Physiological Society Information Network

For Information, e-mail:

aps-server@oac.hsc.uth.tmc.edu

### News From Senior Physiologists

#### Letter to Ralph Kellog

**Donald F. Magee** writes, "I retired from the chair of Physiology at Creighton University in July 1990 after a part-time year; I bought a house here a few months later. I return to North America in the spring and autumn, i.e. when the weather is at its most tolerable...I have met former colleagues on my periodic visits and also at meetings and congresses, which I still go to if they are close. My interest was always whole animal GI physiology, but unfortunately now it is rare even at GI sessions to find anything with which I am familiar or which even arouses my interest. At the Glasgow congress I remember finding a session on adaptation to low temperature comprehensible and interesting but I did meet Ralph Sonnenschein and K.S. Kim there; they and I, I believe, were the only A.C. Ivy physiologists present. Three years earlier in Helsinki there were five of us, including K. Hartiala, the President of the Congress." Magee currently resides at Castlebellingham, Co. Louth, Ireland.

#### Letter to John R. Blinks

**Edward E. Daniel** writes, "I am now a Professor Emeritus at McMaster University in Hamilton, Ontario, Canada...My appointment as a professor was extended the allowable 3 years after my usual retirement date but that was completed in July 1994. Part of this position entails being one of the few

retirees of this institution who wish to continue to be active in research and teaching. There are general guidelines in the University rules which describe what a Professor Emeritus should expect in the way of treatment by his colleagues and the administration of the university. However, it is not clear that administrators plan to follow them...Also, there are those who would like, for various reasons, to take over your equipment.

"My advice to younger colleagues would be that to succeed in science these days you need to be clear and set on your goals and be willing to work your fullest and hardest to achieve them. You also need to be an effective academic politician.

"Besides doing research on the function of a variety of smooth muscles, I am involved in Problem Solving Teaching. This I do by teaching students at levels from high school through post-graduate studies. I also give courses and practical demonstrations of the Problem Solving Approach at various schools around the world on invitation."

#### Letter to Robert F. Grover

**William V. Whitehorn** writes that he is "in a comfortable retirement, pleasantly folled with a variety of non-scientific activities. I do still subscribe to a few journals and follow with interest the events and developments in medical science."

#### AMERICAN ASSOCIATION FOR CANCER RESEARCH 1996 RESEARCH FELLOWSHIPS For Young Scientists at the Postdoctoral or Clinical Fellow Level

The purpose of the AACR's 1996 Research Fellowship in Clinical/ Translational Research, sponsored by Amgen, Inc. and its 1996 Research Fellowship in Basic Research is to foster meritorious clinical, translational, or basic research in the U.S. or Canada by a young scientist currently at the postdoctoral or clinical research fellow level. Candidates must have been a fellow for at least two years but no more than five years prior to the date of the award (April 1996). Academic faculty holding the rank of assistant professor or higher, graduate or medical students, government employees, and employees of private industry are not eligible.

Terms: Both Fellowships provide a one-year grant of \$30,000. Candidates must be nominated by a member of the AACR and submit a detailed application.

**Deadline: February 15, 1996**

For application information contact:  
Jenny Anne Horst-Martz  
American Association for Cancer Research  
Public Ledger Building, Suite 816  
150 South Independence Mall West  
Philadelphia, PA 19106-3483  
(215) 440-9300; FAX (215) 440-9313  
Email: jahmaacr@aol.com

#### Attention! APS members — you can make a difference in K-12 science education!

Now is your chance to work with teachers in your community to deliver inservice training in physiology.

The APS Education Office is looking for physiologists at seven research institutions or organizations nationwide who are interested in working with current or former summer research teachers to form Local Dissemination Teams (LDTs) for delivering brief inservice training programs to local middle and high school teachers. The inservice training focuses on using the neurophysiology activities developed by the Columbus, OH, team of physiologists, science teachers, and science educators, and exercise physiology activities developed by a similar team in San Diego, CA. All LDTs will receive training in delivering these activities at APS headquarters in Bethesda, MD, in the summer of 1996. This program is supported by a grant from the National Science Foundation.

If you're interested in contributing to the education of a young scientist in your community, contact APS Education Officer, Marsha Lakes Matyas at (301) 530-7132; fax: (301) 571-8305; or email: mmatyas@aps.faseb.org.

## Positions Available

**Assistant/Associate Research Scientist.** The University of Wisconsin-Madison Medical School, Department of Surgery, Division of Orthopedic Surgery, is recruiting an Assistant or Associate Scientist to serve as Director of Connective Tissue Research. Qualified applicants must have a PhD or equivalent and postdoctoral training in biological sciences. Connective tissue experience in molecular/cell biology with skills including cell culture systems, animal models, cloning, transcriptional and translational control mechanisms preferred. Applicants must be able to establish an independent and externally funded research program in orthopedic science and interact with and participate in existing multidisciplinary clinical and research programs. Interested applicants should submit a letter of application and curriculum vitae to: Ray Vanderby, PhD, Associate Professor, Division of Orthopedic Surgery, University of Wisconsin Hospital and Clinics, 600 Highland Avenue, Room G5/330 CSC, Madison, WI 53792-3228. [EOE]

**Mammalian or Avian Physiologist.** Assistant Professor position anticipated for fall 1996 in Biological Sciences at the University of New Orleans; PhD required and postdoctoral research experience in physiological adaptations of mammals or birds preferred. The department is affiliated with Audubon Institute's Species Survival Center providing research opportunities involving threatened and endangered mammals and birds. Initially, duties include developing an upper-level animal physiology laboratory and, later, participating in upper-level physiology courses and introductory biology. Our 24 graduate faculty are expected to seek outside funding and engage in research, direct graduate student research, and teach courses. University of New Orleans (approximately 16,000 students) is in the LSU system on a campus overlooking Lake Pontchartrain. Please submit curriculum vitae and three letters of recommendation by February 23, 1996, to Dr. Britt Bromberg, Search Committee, Biological Sciences, University of New Orleans, New Orleans, LA 70148 (e-mail bbbbs@uno.edu). [EOAAE]

### POSITIONS AVAILABLE

There is a \$50 charge for each position listed. Positions will be listed in the next available issue of *The Physiologist* and immediately upon receipt on the APS Gopher Information Server. Listings will remain on the APS Information Server for three months.

A check or money order payable to "The American Physiological Society" must accompany the position listing. Purchase orders will not be accepted unless accompanied by payment. Ads not prepaid will not be printed. Copy must be typed double space and is limited to 150 words. All copy is subject to the editorial policy of *The Physiologist*. EOAAE indicates Equal Opportunity/Affirmative Action Employer and appears only when given on original copy. Copy must reach the APS office before the 15th of the month, two months preceding the month of issue (e.g., before February 15th for the April issue). Mail copy with payment to:

*The Physiologist*  
APS  
9650 Rockville Pike  
Bethesda, MD 20814-39911

SPIE's International Symposium

## Medical Imaging 1996

10-15 February 1996

Newport Beach Marriott Hotel & Tennis Club  
Newport Beach, California USA

...where physiology  
and imaging intersect.

Technical Conference on

### Physiology and Function from Multidimensional Images

- Pulmonary Function
- Vascular Imaging
- Airway: Function and Structure
- Physiologic Modeling and Neurologic Function

Don't miss the Poster Sessions on Cardiovascular  
Structure/Function and Tissue Characterization!



For more information  
Telephone 360/676-3290 E-mail spie@spie.org

## Books Received

- Active Hearing.* A. Flock, D. Ottoson, and M. Ulfendahl (Editors). *Wenner-Gren International Series*, Volume 65. Oxford, UK: Elsevier Science Ltd., 1995, 376 pp., illus., index, \$125.00. ISBN: 0-08-042514-3.
- The Anatomy and Physiology of the Mammalian Larynx.* DFN Harrison. New York, NY: Cambridge University Press, 1995, 288 pp., illus., index, \$74.95. ISBN: 0-521-45321.
- Cardiovascular Regulation.* David Jordan and Janice Marshall (Editors). London, UK: Portland Press Ltd, 1995, 170 pp., illus., index, \$35.00. ISBN: 1-85578-024-0.
- Clinical Pulmonary Hypertension.* A.H. Morice (Editor). *Portland Press Research Monograph VIII.* London, UK: Portland Press Ltd, 1995, 280 pp., illus., index, \$128.00, hb. ISBN: 1-85578-074-7.
- Crib Death.* Warren G. Guntheroth, M.D. Armonk, NY: Futura Publishing Company, Inc., 1995, 439 pp., illus., index, \$72.00. ISBN: 0-87993-618-5.
- Disabled Children & Developing Countries.* Pam Zinkin and Helen McConachie (Editors). New York, NY: Cambridge University Press, 1995, 238 pp., index, \$59.95. ISBN: 0-898683-04-2.
- Electrophysiology of Mind: Event-Related Brain Potentials and Cognition.* Michael D. Rugg and Michael G.H. Coles (Editors). *Oxford Psychology Series*, No. 25. New York, NY: Oxford University Press, 1995, 220 pp., illus., index, \$75.00. ISBN: 0-19-852135-9.
- Fever and Antipyresis: The Role of the Nervous System.* Keith E. Cooper. New York, NY: Cambridge University Press, 1995, 182 pp., illus., index, \$49.95. ISBN: 0-521-41924-7.
- Fluorescence Microscopy*, Volume 2. F.W.D. Rost. New York, NY: Cambridge University Press, 1995, 457 pp., illus., index, \$175.00. ISBN: 0-521-41088-6.
- Gametes - The Spermatozoon.* J.G. Grudzinskas & J.L. Yovich (Editors). New York, NY: Cambridge University Press, 1995, 316 pp., illus., index, \$110.00, hb, \$39.95, pb.
- High-Altitude Medicine and Pathology.* Fourth Edition. Donald Heath and David Reid Williams. New York, NY: Oxford University Press, 1995, 449 pp., illus., index, \$135.00. ISBN: 0-19-262504-7.
- Methods in Neurosciences: Quantitative Neuroendocrinology.* Volume 28. Michael L. Johnson and Johannes D. Veldhuis, Volume 28. San Diego, CA: Academic Press, 1995, 433 pp., illus., index, \$90.00. ISBN: 0-12-185298-9.
- Nutrition and Health: Topics and Controversies.* Felix Bronner (Editor). Boca Raton, FL: CRC Press, Inc., 1995, 250 pp., illus., index, \$49.95. ISBN: 0-8493-7849-4.
- Photographic Atlas of the Rat Brain: The Cell and Fiber Architecture Illustrated in Three Planes with Stereotaxic Coordinates.* Lawrence Kruger, Samuel Saporta, and Larry W. Swanson. New York, NY: Cambridge University Press, 1995, 299 pp., illus., index, \$69.95. ISBN: 0-521-42403-8.
- Physiological Monitoring and Instrument Diagnosis in Perinatal and Neonatal Medicine.* Yves W. Brans and William W. Hay, Jr. (Editors). New York, NY: Cambridge University Press, 1995, 385 pp., illus., index, \$130.00. ISBN: 0-521-41951-4.

## Book Reviews

### Advances in Industrial Ergonomics and Safety VI

*Proceedings of the Annual International Industrial Ergonomics and Safety Conference.*

Fereydoun Aghazadeh.

San Antonio, TX 1994, Bristol, PA: Taylor & Francis, 1995, 803 pp., illus., index, \$195.00. ISBN: 0-7484-0085-0

*Advances in Industrial Ergonomics and Safety VI* is the result of the 1994 Annual International Industrial Ergonomics and Safety Conference where two hundred authors from across the world, representing industry, academic and research institutions, and consulting companies, presented papers. From this conference, 114 papers were chosen for inclusion in this book. These papers address a variety of ergonomic and safe-

ty issues in medicine, transportation, space, human computer interface, manual material handling, hand tools, evaluation and testing, design and implementation of ergonomic programs in industry, system safety and reliability, work and workplace design, environmental stresses, equipment design, cumulative trauma disorders, and shift work.

*Advances in Industrial Ergonomics and Safety VI* contains 20 chapters, the conference address at the beginning of the book, an appendix, and an author index. Each chapter contains from four to nine papers. The appendix is the Constitution of the International Foundation for Industrial Ergonomics and Safety Research.

Chapter 1, "Methodology and Evaluation Techniques," includes some highly technical papers, including one involving the use of mathematical models of ergofields to devise projections of effects of changes on the workplace. There are also papers that look at performance-based testing for fitness

for duty and an evaluation of step tests for physical work capacity evaluation. "Regulations and Standards" (Chapter 2) includes a paper addressing ways to move from compliance-based regulatory standards to standards that are more performance based or processed based. There are also papers that address job analysis for the Americans with Disabilities Act and with the new NIOSH guidelines.

"Epidemiology and Cost of Industrial Injuries," (Chapter 3) contains papers that point to the necessity of analyzing how and why injuries and economic losses occur in order to effectively design prevention and implementation strategies. For example, Stobbe and Plummer's analysis of back injuries in underground coal mines revealed that injury factors were similar for lost and non-lost time injuries, thus indicating that both types should be analyzed when determining how to prevent back injuries. "System Safety and Reliability" (Chapter 4) contains an excellent paper by Helmut that reminds us of the reasons why "the human being should be the measure for all things." "Training and Industrial Ergonomics Programs" (Chapter 5) contains eight papers on this subject, whereas Chapter 6, "Work Duration and Fatigue," contains five. In Chapter 6, Khaleque and Pervin write about shift work and conclude that gender differences in perceived difficulty and tolerance to shift work do exist.

"Environmental Stresses" (Chapter 7) contains six papers describing programs or research designed to obtain a better understanding of the effect of environmental stresses upon workers. Included are papers involving vibrations, illumination, heat exposure, and noise.

Much additional ergonomic information and research is presented in the remaining chapters. In Chapter 9, Jaraiedi and Giorcelli conclude that there is no loss of productivity or efficiency from inspectors wearing a half-face piece dual-cartridge respirator. Thus, with respect to respirator usage, there should be no cost component for lost production in a cost analysis and no time allowance given in establishing time standards for inspection tasks. The only factor that did affect variability of speed and accuracy was the individuality of

grasping small objects and opening jars should be given high priority when diagnosing CTS. In Chapter 19, Annis presents some interesting data regarding the changing anthropometric diversity in the US workforce and proposes a procedure to design to accommodate a 5th to 95th percentile range for a given dimension.

*Advances in Industrial Ergonomics and Safety VI* is useful as a reference text to ergonomic and safety professionals, especially for a particular subject area as listed in the chapter headings. It does provide a convenient resource for perusing what researchers in the field of ergonomics and industrial safety currently find important, pertinent, and useful. However, *Advances in Industrial Ergonomics and Safety VI* does not contain any editorial comments or critiques of the material presented. The reader must be able to judge the merit or lack thereof regarding any particular research methodology or conclusions. The print varies considerably as the papers are published in their original format. Another limiting factor is the lack of author biographical information and dates regarding when the research was conducted. The cost of the book might be compared to the purchase price of 20 cassettes or printed papers from a professional conference.

Darlene Hess  
University of New Mexico

## Neural Activity and the Growth of the Brain

Dale Purves

Port Chester, NY: Cambridge University Press, 1994, 108 pp., illus., index, \$15.95. ISBN: 0-521-455707

In a series of lectures delivered under the auspices of the Academia Nazionale dei Lincei and cosponsored by IBM, Italia, Dale Purves explored the role of neural activity in the development of the brain. He systematically guided the audience (and the readers) through four topics in four lectures: maps, modules, trophic interactions, and activity. The growth of the brain was first examined at the macroscopic level of maps and modules, then at the cellular level of interactions that help shape these structures, and finally at the level of neural activity that plays a critical role in this process. The key message is that experience generates neural activity, which, in turn, modifies existing circuitry and/or elaborates new circuitry in the course of brain growth and maturation, thereby influencing information storage.

These concepts, although self-evident, have not been thoroughly assimilated previously with regard to brain growth. They do, however, remind us of the Hebbian rule of synaptic strengthening (1), in that "some growth process or metabolic change takes place" when cell A repeatedly excites cell B and stabilizes the synapse. Purves speculates that the exaggerat-

---

**The book provides a convenient resource for perusing what researchers in the field of ergonomics and industrial safety currently find important.**

---

people, again demonstrating the need for carefully fitting the individual to the job. In Chapter 14, Jackson et al., in a case study of an athlete, conclude that only abstention from performing a precipitating task, not treatment, is effective in carpal tunnel syndrome (CTS) symptom retardation. Another study in this section (Crumpton and Congleton) reports on the value of investigating subjective symptoms associated with CTS. According to these authors, complaints of difficulty



ed growth of certain areas in the sensory-motor maps is related to the storage of information in the maturing brain. Ample examples can be given from the expanded representation of the face, hand, and speech in the human cortex to barrel fields in the rodent brain. From maps, the discussion turned to modules, which may be regarded as the basic functional units in many regions of the brain (although Purves did not refer to them as such). Examples of modules were given in Table 2.1, but the list could easily be expanded to other areas, such as the retrosplenial cortex (2), perirhinal cortex (3), area V4 (4), and pontine nuclei (5). Purves argued convincingly for the existence of both the static model (barrels and blobs) and the construction model of modules (a four-fold increase in the number of olfactory glomeruli postnatally).

One possibility of modular formation that could be expanded by Purves is the role of dendrites. These structures are the

---

**The book is written in a lucid style that can be followed easily even by beginning students of neuroscience.**

---

major receptive sites of neurons and form the core components of modules, such as the olfactory glomeruli (6), striate cortical puffs (7), somatosensory columns (8), and pontine modules (5). The elaboration of dendrites occurs primarily postnatally and coincides with synaptic proliferation and brain growth. Dendrites are also of special significance when one considers the role of neuronal activity in information storage (see below).

Dendritic growth and target cell geometry, however, are the theme of the third lecture on "Trophic Interaction." With the ciliary ganglion cells as a model, Purves proposed that dendritic arborizations actually contribute to the mitigation of competition by spatially segregating the innervating axons. With this, he raised the provocative possibility that "one of the major purposes of neuronal dendrites is to modulate competitive interactions between cells." Rather than focusing on "pruning" and "selective stabilization," he stressed "progressive addition of synapses and circuitry" with the aid of trophic factors, such as nerve growth factor. The growth of neuropil, in turn, is related to the growth of maps, modules, and the brain.

The final chapter is devoted to the role of electrical activity in the growth of the brain. Purves believes that neural activity generated by postnatal experience modulates the development of the nervous system. More importantly, it is the simultaneous activity of the pre- and postsynaptic cell that provides "trophic support" from the target neuron to the innervating axon, indicating, once again, that a type of Hebbian mechanism functions in the developing brain. Purves pointed out that, in comparison to less specialized areas, modules have higher neural activity, more intense metabolic activity, greater capillary density, and grow the

most during development. This suggests to him that "brain growth is modulated by the differential metabolic and electrical activity of its component parts," an idea that he whimsically referred to as the "glow and grow theory."

The model celebrates experience, through neural activity, in the process of brain growth, but it does not differentiate between excitatory and inhibitory synapses. In fact, inhibition was not mentioned at all in this book, and one can only assume that Purves has included it under the larger umbrella of "neuronal activity." The role of dendrites also deserves greater emphasis. Much of the synaptic actions takes place at the axo-dendritic synapse (and dendro-dendritic synapse in the case of the olfactory bulb). Such slow depolarizing activity may escape detection by the electrode placed predominantly in the region of the cell bodies but probably represents the bulk of neuronal activity in the brain. In terms of energy demand, dendritic metabolism probably accounts for most of the energy consumption of the brain (7,9). While Purves recognized the significance of the neuropil, he stopped short of highlighting the dendritic contribution.

A few points that deserve clarification are as follows. 1. Page 32: blob or puff neurons project to thin (and not thick) stripes in area 18 (not 17), and their physiological characteristics go beyond wavelength selectivity (10-12). Several labs would also challenge the statement that "although exactly what they (blobs) do remains a mystery." 2. Page 36: individual olfactory glomerulus has been regarded as a functional unit of activity with some degree of odor selectivity (13). To say that "the function of glomeruli is not known" may be too modest.

The book is written in a lucid style that can be followed easily even by beginning students of neurosciences. Illustrations are to the point and nicely complement the text. Although the lectures were delivered in June 1992, some of the references were updated to 1993.

Margaret Wong-Riley  
Medical College of Wisconsin

### References

1. Hebb, D.O. *The Organization of Behavior: A Neuropsychological Theory*. New York: Wiley, 1949.
2. Wyss, J.M., T. Van Groen, and K. Sripanidkulchai. Dendritic bundling in layer I of granular retrosplenial cortex: Intracellular labeling and selectivity of innervation. *J. Comp. Neurol.* 295:33-42, 1990.
3. Van Hoesen, G.W., and A. Solodkin. Some modular features of temporal cortex in humans as revealed by pathological changes in Alzheimer's disease. *Cerebral Cortex* 3:465-475, 1993.
4. Yoshioka, T., J.B. Levitt, and J.S. Lund. Intrinsic lattice connections of macaque monkey visual cortical area V4. *J. Neurosci.* 12:2785-2802, 1992.
5. Schwarz, C., and P. Thier. Modular organization of the pontine nuclei: dendritic fields of identified pontine projec-



tion neurons in the rat respect the borders of cortical afferent fields. *J. Neurosci.* 15:3475-3489, 1995.

6. Shepherd, G.M. Synaptic organization of the mammalian olfactory bulb. *Physiol. Rev.* 52:864-917, 1972.

7. Wong-Riley, M.T.T. Primate visual cortex. Dynamic metabolic organization and plasticity revealed by cytochrome oxidase. In *Cerebral Cortex*, edited by A. Peters, and K.S. Rockland. New York: Plenum Press, 1994, vol. 10, p. 141-200.

8. Feldman, M.L. and Peters, A. A study of bands and pyramidal dendritic clusters in the cerebral cortex. *Brain Res.* 77:55-76, 1974.

9. Lowry, O.H., N.R. Roberts, K.Y. Leiner, M.L. Wu, A.L. Farr, and R.W. Albers. The quantitative histochemistry of brain. III. Ammon's horn. *J. Biol. Chem.* 207: 39-49, 1954.

10. Livingstone, M.S., and D.H. Hubel. Segregation of form, color, movement, and depth: anatomy, physiology, and perception. *Science* Washington DC. 240:740-749, 1988.

11. Tootell, R.B.H., M.S. Silverman, S.L. Hamilton, E. Switkes, and R.L. DeValois. Functional anatomy of macaque striate cortex. V. Spatial frequency. *J. Neurosci.* 8:1610-1624, 1988.

12. Felleman, D.J., and D.C. Van Essen. Distributed hierarchical processing in the primate cerebral cortex. *Cereb. Cortex* 1:1-47, 1991.

13. Lancet, D., C.A. Greer, J.S. Kauer, and G.M. Shepherd. Mapping of odor-related neuronal activity in the olfactory bulb by high-resolution 2-deoxyglucose autoradiography. *Proc. Natl. Acad. Sci. USA* 79:670-674, 1982.

## Three-Dimensional Analysis of Human Movement

Paul Allard, Ian A.F. Stokes, and Jean-Pierre Blanche  
Champaign, IL: Human Kinetics, 1995, 372 pp., \$45.00  
ISBN: 0-87322-623-2

Just as motion analysis laboratories have proliferated in the past decade, so have published texts relating to this technology abounded. This book distinguishes itself among many available in its comprehensive scope, excellent scientific content, and direct applicability to the multiple disciplines that utilize three-dimensional (3-D) technology.

The editors state that it is a "technical manual and reference for the scientific field of biomechanics, demonstrating both the possibilities and potential pitfalls of 3-D analysis of human movement." The intended audience includes professionals and graduate students currently working in the field, as well as other scientists and clinicians striving to understand the theoretical, technical, and clinical aspects of motion analysis.

The primary focus of the text is on the engineering aspects of dynamic biomechanical analyses. Twenty-six contribu-

tors, each an internationally recognized biomechanist or clinician, address topics specific to their areas of expertise. Part I details the diversity of instrumentation available to assess motion and discusses the respective applications and limitations. A historical perspective is provided when necessary to understand how current instrumentation has evolved. Of par-

---

### This book is a state-of-the-art review of a technology that is evolving rapidly.

---

ticular value is the fact that the developer and/or supplier of most (if not all) devices or software programs mentioned is specified, complete with journal references where available.

Since all motion systems serve to recreate the movement sequences of interest, data collection methods and processing techniques have a profound effect on the quality of the reconstruction. However, for many clinicians, researchers, and consumers of information from motion analysis laboratories who are primarily interested in the output from a 3-D assessment, an imaginary "black box" exists between the actual movement of interest and the final representation. Within this box are crucial choices in hardware and software, each with inherently different data capture methods, filtering techniques, and processing algorithms.

Chapter 2, in particular, exposes the contents of this black box and provides necessary information for the nonengineer to make well-informed choices among motion systems. Assumptions and potential sources of error are specified for each option, which provide the reader with a realistic evaluation of the data quality that can be expected based on these choices. Other chapters in Part I deal with the mathematical techniques of smoothing and differentiating data, the less familiar application of X-ray photogrammetry, and options in computer graphic visualization and animation of human motion.

Part II delves into modeling of human movement based on cadaver and imaging data. This type of information can be found scattered among engineering and other scientific journals but is synthesized beautifully in this text. The value of this section is that it reviews and critiques current biomechanical models, rather than merely listing different approaches, so that the reader is guided in the evaluation of the techniques available. Since noninvasive in vivo methods for studying the role of muscle activity in the production of human motion are virtually nonexistent, innovative strategies are required to stimulate the complex interactions of muscles within and across joints. Especially enlightening was the review by Winters of neuromuscular modeling, which discusses the necessity of balancing complexity and simplicity for models to ultimately be useful to scientists and clinicians.

Analysis of human motion was not created, nor would it survive, in a vacuum. It would not exist without industrial, medical, or sports-related applications. Part II focuses on the major current uses of 3-D technology while exploring poten-

tial areas of expansion. Gait analysis of normal persons and those with musculoskeletal disorders is the most familiar extension of 3-D technology. Research emanating from these laboratories has revolutionized the field by emphasizing that motor control problems have biomechanical, as well as physiological and neurological, solutions. The interest in unlocking the biomechanical "secrets" of elite athletes in an attempt to improve performance has led to the use of this technology in sports training and coaching. The same instrumentation that can characterize a pathological gait pattern or an exceptional performance can also be applied in the workplace to minimize injury and maximize efficiency.

*Three Dimensional Analysis of Human Movement* is a state-of-the-art review of a technology that is evolving rapidly. I suspect that this exceptional resource will long outlast similar contemporary publications. Each chapter is essentially a comprehensive review of a topic area complete with extensive references. I envision myself referring to it on a regular basis. I recommend this book unequivocally to all motion analysis professionals, including engineers, physical therapists, kinesiologists, and orthopaedic surgeons. Neuroscientists, physiologists, and anatomists working in the areas of neuromuscular control would also find this text very beneficial.

Diane L. Damiano  
KCRC Motion Analysis Laboratory

## Microbes, Bugs, and Wonder Drugs

Fran Balkwill and Mic Rolph with Victor Darley-Usmer  
London: Portland Press, 1995, 128 pp. illus., index, \$26.00  
ISBN: 1-85578-065-8

Between kindergarten and high school, most children progressively lose interest and proficiency in science. Especially alarming about this science illiteracy is that young children delight in science exploration. Science books that capture interest and generate excitement can help restore science literacy among children and teenagers. *Microbes, Bugs, and Wonder Drugs* is the first book in a new *Making Sense of Science* series written specifically for children, teenagers, and their families. Unfortunately, I cannot recommend *Microbes, Bugs, and Wonder Drugs* as a resource for its intended audience.

The book is organized in sections that discuss molecular and cellular structure, bacteria and viruses, cancer, allergies, analgesics and anesthetics, intoxicants (e.g., alcohol, nicotine, and cocaine), and the impact of drugs on individuals and societies; a glossary is included to assist the reader. In each section, the authors present examples that many young readers will find familiar; the authors also chronicle the development of well-known drugs such as penicillin and aspirin; the authors' utilization of the familiar is an effective educational

technique. Controversial topics (e.g., AIDS and the legalization of marijuana) are presented objectively.

In general, the book is well organized. Within a section, however, changes in topic are often abrupt: for example, the authors write about LSD and then switch topics to alcohol without warning. Colorful drawings decorate and illustrate the book; in some cases, however, these distract from the actual text. Furthermore, every illustration is a drawing; some drawings were generated from photographs or photomicrographs; this approach renders the book less realistic. Because children are fascinated by the real thing, I believe that actual images of bacteria, viruses, cells, scientists, physicians, patients, etc. would have resulted in more effective graphics.

Clarity and precision are essential in a book designed for children, teenagers, and their families. In this book, the writing is sometimes ambiguous and imprecise. For example, the authors write that "This year, about 90% of the people in Great Britain (including you!) will suffer from some sort of viral infection." Another example of imprecision is included in a discussion on drug therapies for asthma; the reader learns that "scientists have been able to design drugs that act on the lung muscles, with less effect on the heart."

Children's attitudes about gender and science are acquired early and insidiously: a second grade boy once told me that scientists were men. Science books must provide an atmosphere that promotes interest in science (and mathematics) among all children. I expected that *Microbes, Bugs, and Wonder Drugs* would satisfy this important requirement when I read the following:

*In every ancient civilization, medicine men, witch doctors, shamans and wise women were all-powerful in treating disease....By trial and error, the early medicine men and women found treatments for most afflictions.*

I also noted that the book's illustrations portray both sexes.

This attention to gender balance is wasted, however, when the authors advocate the need to protect one's skin from the sun (in the section on cancer) with an accompanying illustration of a young woman in a bikini. This picture has no place in a science book; its inclusion reflects poor editorial judgment and is sufficient cause to disqualify the book as an educational resource for children and teenagers, the very audience for which the book was designed.

In summary, however, although *Microbes, Bugs, and Wonder Drugs* is not an ideal science resource for children, teenagers, and their families, it is a useful source of information and ideas for any scientist that wishes to develop a school presentation on the subject.

Douglas Curran-Everett  
University of Colorado Health Sciences Center

## Announcing the Spaceline Database

SPACELINE, the newest of the National Library of Medicine's specialized databases, is composed of citations to publications on life sciences research related to space. Developed jointly by the Life and Biomedical Sciences and Applications Division of NASA and NLM, it contains references from 1961 to the present and includes a Space Flight/Mission field for locating results from particular flights or groups of flights. It includes references pertaining to health and productivity of humans in space and the physical and psychological effects of gravity and the space environment on living systems.

Access to SPACELINE is via modem or Internet, and an NLM user account is necessary. For further information please contact SPACELINE, Department of Physiology, USUHS, 4301 Jones Bridge Road, Bethesda, MD 20814 (tel. 301-295-2482, fax 301-295-5271).

## Joint APS/Spanish Physiological Society Meeting Venue Change

Plans are underway for a joint APS/Spanish Physiological Society (SECF) meeting in Malaga-Torremolinos, Spain, to coincide with the XVIII National Congress of Physiology in early 1997.

Ethan Nadel, Program Committee Chair, is currently working with his Spanish counterpart to organize the APS portion of the program. Nadel is in the process of identifying two symposia chairs and will assist them in organizing sessions that will be intertwined with SECF's program. A call for papers will be published, similar to those that were sent to members for previous meetings.

At the APS-Taiwan and British meeting, the last joint meeting in which APS participated, 80-100 APS members attended. It is anticipated a similar number of members will be interested in this meeting.

## APS Sustaining Associate Members

*The Society gratefully acknowledges the contributions received from Sustaining Members in support of the Society's goals and objectives.*



Abbott Laboratories  
Alliance Pharmaceutical Corporation  
American Medical Association  
Amgen, Inc.  
Axon Instruments, Inc.  
Berlex Biosciences  
Boehringer Ingelheim Corporation\*  
Boeing Defense & Space Group  
Burroughs Wellcome Company  
Coulbourn Instruments, Inc.  
Dagan Corporation  
Du Pont Pharmaceuticals  
Fisons Pharmaceuticals  
Genentech, Inc.\*  
Glaxo, Inc.  
Gould Instrument Systems, Inc.  
Grass Foundation  
Groupe de Recherche Servier, France  
Harvard Apparatus  
Hoechst-Roussel Pharmaceuticals, Inc.  
Hoffman-La Roche, Inc.\*  
ICI Pharmaceuticals  
Jandel Scientific  
Janssen Research Foundation  
The R. W. Johnson Pharmaceutical Research Institute  
Kabi Pharmacia  
Lederle Laboratories

Eli Lilly and Company  
Lockheed Missles & Space Company, Inc.  
The Mack Printing Group  
MacLab Division, ADInstruments, Inc.  
Marion Merrell Dow, Inc.  
McNeil Pharmaceuticals  
Merck & Company, Inc.\*  
Miles Inc.  
NARCO Bio-Systems  
Norwich Eaton Pharmaceuticals, Inc.  
Pfizer, Inc.  
Pharmacia, Inc.  
Procter & Gamble Company  
Quaker Oats Company  
Rhone-Poulenc Rorer  
Sandoz Pharmaceuticals Corporation\*  
W.B. Saunders Company  
Schering-Plough Corporation\*  
G.D. Searle and Company  
SmithKline Beecham  
Squibb Corporation\*  
Sutter Instrument Company  
The Upjohn Company\*  
Warner-Lambert/Parke Davis  
Wyeth-Ayerst Laboratories  
Zeneca, Inc.

*\*Second Century Corporate Founders*

## Scientific Meetings and Congresses

- Fourth National Symposium on Biosafety: Working Safely With Research Animals**, January 27-31, 1996, Atlanta, GA. *Information:* Fourth National Symposium on Biosafety, c/o Exposition and Meeting Concepts (EMC), PO Box 250381, Atlanta, GA 30325-0381. Tel: 404-355-4884; fax: 404-355-6765.
- Medical Imaging 1996**, February 10-15, 1996, Newport Beach, CA. *Information:* Society for Photo-Optical Instrumentation Engineers, P.O. Box 10, Bellingham, WA 98227-0010. Tel: 800-483-9034 or 360-676-3290; fax: 360-647-1445; e-mail: spie@spie.org.
- International Conference on Pregnant Women in the Workplace: Sound and Vibration Exposure**, February 22-23, 1996, Gainesville, FL. *Information:* Dr R.M. Abrams, university of Florida, Perinatology Research Laboratory, Department of Obstetrics and Gynecology, PO Box 100294, Gainesville, FL 32610-0294; Tel: 904 392-3179; fax: 904-392-4955; email: rabrams.obgyn@obgyn.ufl.edu.
- Obesity: Advances in Understanding and Treatment**, March 4-6, 1996, Washington, DC. *Information:* IBC USA Conferences, 225 Turnpike road, Southborough, MA 01772-1749. Tel: 508-481-6400; fax: 508-481-7911.
- The Fourth International Congress of Behavioral Medicine**, March 13-16, 1996, Washington, DC. *Information:* Society of Behavioral Medicine, 103 South Adams Street, Rockville, MD 20850. Tel: 301-251-2790; fax: 301-279-6749; email: SocBehMed@aol.com.
- Latest Therapeutic Applications of Cytokines: Control of Inflammation, Growth and Differentiation**, March 14-15, 1996, Philadelphia, PA. *Information:* IBC USA Conferences, 225 Turnpike road, Southborough, MA 01772-1749. Tel: 508-481-6400; fax: 508-481-7911.
- VI International Symposium on Avian Endocrinology**, March 31-April 5, 1996, Alberta, Canada. *Information:* Dr. Robert J. Etches, University of Guelph, Dept. of Animal and Poultry Science, Guelph, Ontario, Canada N1G2W1. Tel: 519-824-4120; Fax: 519-836-9873; email: retches@aps.uoguelph.ca.
- 17th Annual International Gravitational Physiology Meeting**, April 14-19, 1996, Warsaw, Poland. *Information:* Professor Hilding Bjurstedt, Environmental Physiology Laboratory, Karolinska Institute, 171 77 Stockholm, Sweden. Tel: 46-8334012; fax: 46-8339702.
- 21st Annual AAAS Colloquium on Science and Technology Policy**, April 17-19, 1996, Washington, DC. *Information:* Directorate for Science and Policy Programs, American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005. Tel: 202-326-6600; fax: 202-289-4950; email: science\_policy@aaas.org.
- ARVO Annual Meeting**, April 21-26, 1996, Ft. Lauderdale, FL. *Information:* ARVO Central Office, 9650 Rockville Pike, Bethesda, MD 20814-3998. Tel: 301-571-1844; fax: 301-571-8311.
- 6th Annual Cell Adhesion Molecules, and Matrix Proteins**, May 6-7, 1996, San Francisco, CA. *Information:* IBC USA Conferences, 225 Turnpike Road, Southborough, MA 01772-1749. tel: 508-481-6400; fax: 508-481-7911.
- Society for Information Display International Symposium Seminar & Exhibition**, May 12-17, 1996, San Diego, CA. *Information:* Russel Martin, Xerox PARC, 3333 Coyote Hill Road, Palo Alto, CA 94304; Tel: 415-812-4538; Fax: 415-812-4605; Email: ramartin@parc.xerox.com
- Biomechanics and Neural Control of Movement IX: Neural-Mechanical Control: Interaction Between Neural Circuits and Biomechanics**, June 1-6, 1996, Mt. Sterling, OH. *Information:* Engineering Foundation, 345 E. 47th Street, New York, NY 10017. Tel: 212-705-7836; fax: 212-705-7441; email: engfnd@aol.com.
- 12th International Symposium on Flavins and Flavoproteins**, June 30-July 6, 1996, Calgary, Canada. *Information:* Dr. Kenneth J. Stevenson, Department of Biological Sciences, University of Calgary, Calgary T2N 1N4, Alberta, Canada. Fax: 403-284-4184.
- 4th IUBMB Conference: The Life and Death of the Cell**, July 14-17, 1996, Edinburgh, Scotland. *Information:* The Conference Assistant IUBMB 1996, The Biochemical Society, 59 Portland Place, London W1N 3AJ. Tel: 0171 580 5530; fax: 0171 637 7626; e-mail: meetings@biochemsoc.org.uk.
- Overtraining & Overreaching in Sport: Physiological, Psychological, and Biomedical Considerations**, July 14-17, 1996, Memphis, TN. *Information:* Laura Wilhelm Tel.: 800-747-4457; Int. Tel.: 217-351-5076.
- Bioartificial Organs: Science and Technology**, July 21-26, 1996, Nashville, TN. *Information:* Barbara Hickernell, Engineering Foundation Conferences, 345 E. 47th Street, New York, NY 10017. Tel: 212-705-7836; fax: 212-705-7441; e-mail: engfnd@aol.com.
- VI World Conference on Clinical Pharmacology and Therapeutics and VI Congress of the Interamerican Society for Clinical Pharmacology and Therapeutics**, August 4-10, 1996, Buenos Aires, Argentina. *Information:* CPT96 and ISCPT VI, Marcelo T. de Alvear 1980, 1122 Buenos Aires, Argentina. Tel: 54-1-81-6650; fax: 54-1-814-2733.
- Bernstein's Traditions in Motor Control**, August 23-25, 1996, University Park, Pennsylvania. *Information:* Dr. Mark Latash, Pennsylvania State University, Biomechanics Laboratory, University Park, PA 16802. Tel: 814-863-5374, fax: 814-865-2440, e-mail: mll11@psu.edu.
- Second World Congress of High Altitude Medicine**, September 24-27, 1996, Cusco, Peru. *Information:* Dr. Fabiola León-Velarde, Universidad Peruana Cayetano Heredia, Dpto. de Fisiología, Apartado 4314, Lima 100, Peru. Fax: 51-14-482 34 35; e-mail: fabiolv@upch.edu.pe.