



# The Physiologist

## Global Manpower Needs for Integrative Systems Physiologists

Allen Cowley

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One of the perspectives gained over the past several years of my IUPS Presidency is that there is an emerging recognition everywhere I travel of the need to revitalize and train more integrative systems physiologists. This is not just a post-genomic perspective held by scientists in the United States, but it has been a theme reiterated by the scientists with whom I have interacted at meetings in France, Germany, Denmark, Italy, the Czech Republic, Hungary, the United Kingdom, Canada, Brazil, Japan and China. It appears that it has become widely recognized that it is now acceptable to advocate the goal of carrying out research in ways that will provide an understanding of the behavior of the whole living organism, which is another way of saying that there is a recognition that we need to be doing more physiology. In a recent editorial in the journal *Physiological Genomics* related to systems biology, I stated that "an increasing number of scientists have recognized that in this post-genomic world, it is imperative that our institutions of science be proactive in creating ways to converge functional genomics and integrative physiology. The limitations of pure reductionism to help us understand complex function have become abundantly apparent. It can be argued that this type of restructuring work is premature. But many, including me, have chosen to believe that now is the time to begin building the scientific infrastructures that will enable an integrated understanding of the function of complex organisms and chronic diseases.

How much more data do we need to add to the already more than 12,000,000 computer searchable references represented in PubMed before we begin to take this task seriously?" (*Physiol Genomics*. 2004 Feb 13; 16(3):285-6.). I suggested that now is "the time for a convergence of scientific experts in genomics, proteomics, metabolomics, biochemistry, bioinformatics, biophysics, cell and molecular biology, the physiological sciences, and computer modeling to bring about new levels of understanding of the emergent properties and functions of living systems."

It is evident that the physiological sciences represent one of the most important elements of the so-called "systems biology" approach for the understanding of complex integrated biology. There is in this regards, however, increasing strain upon our universities to train the physiologists needed to design and carry out meaningful studies that can link the 36,000 genes and more than 150,000 proteins to valid pathways of complex function and disease. Because of these challenges, over the past several years, there have finally been efforts to project the global manpower needs for integrative systems biologists. Although the numbers and projections are moving targets, some quantifiable data exist from the United States and several regions of the world. As reviewed in this article it is evident that there is indeed an enormous global manpower shortage to meaningfully carry out such work.

About a year ago I participated in a  
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meeting organized by the Life Sciences Research Office (LSRO) sponsored by the American Physiological Society (APS) and the American Society for Pharmacology and Experimental Therapeutics (ASPET) to obtain a perspective on the status within the United States of integrative/systems physiology and to ascertain the manpower needs in this area of science. In preparation for that conference, the IUPS also forwarded the relevant questions of this LSRP survey to each of the IUPS Commission Chairs and Council members in an effort to gain a more global perspective regarding some of these issues. In the present newsletter, I shall summarize the results of the LSRO survey (Life Sciences Research Office (2003) "The Status and Future of Integrative and Organ Systems Sciences in the United States." (Falk, M & Emenaker, N., Eds.) Bethesda, MD: Life Sciences Research Office, Inc.) together with information gained from the other sources represented in Figure 1 in an effort to provide some semi-quantifiable perspectives of the present global manpower needs for integrative systems physiologists.

Top ten countries by highly cited scientists (Figure 2). It is useful to first gain some perspective on those countries or regions of the world where the most highly cited scientists currently reside. As cited from the *Scientist* (August 2003), these are the United States followed by the United Kingdom, Germany, Canada, Japan, France, Switzerland, Sweden, Italy and Australia. Since the statistics obtained from the LSRO survey of US academic institutions represent a

**Figure 2. Top 10 Highly Cited Scientists by Country.**

Rank	Country	# of highly cited	% of high cited	# of places	Scientists per places	Cited per million population
1	US	815	66.7	90	9.06	3.16
2	UK	100	8.2	24	4.17	1.72
3	Germany	62	5.1	21	2.95	0.78
4	Canada	42	3.4	15	2.80	1.53
5	Japan	34	2.7	14	2.43	0.27
6	France	29	2.3	11	2.64	0.50
7	Switzerland	26	2.1	5	5.20	3.78
8	Sweden	17	1.4	10	1.70	0.29
9	Italy	17	1.4	10	1.70	0.29
10	Australia	17	1.4	9	1.88	0.96

large proportion of the overall scientific activity, the LSRO survey may reflect major directions of manpower needs for integrative/systems physiologists. As cited by the National Science Foundation Survey, 25-30% of all those entering college in the US intend to study science, but fewer than half actually even complete a baccalaureate degree over five years (data compiled in 2001). Despite an upward trend for the general area of science over the past 20 years, the number of PhD's trained in biological sciences and engineering has been declining since 1996. These reductions stem from a declining number of foreign-borne students seeking graduate degrees in the US and increasing availability of opportunities in their own countries. In 1999, 74% of the foreign PhD students intended to remain in US, but by 2001 only 50% had done so due to opportunities at home. The decline in the training of foreign-born students has inevitably continued to erode since 9/11 given the well-recognized difficulty in obtaining US visas.

As pointed out in an editorial in *Nature Genetics* 34:233, 2003, however, "If foreign born scientists in the US are taking advantage of the increasingly attractive opportunities in their home countries, that ought to be a net gain for international science, while at the same time giving young American scientists a bit more leverage in their own marketplace."

Why the need for integrative and organ systems sciences? Based on the summary report of this LSRO conference, six major reasons were cited as to why there is a need for more integrative and organ system sciences. First, "findings from the reductionist sciences can only be extrapolated to a refined and defined discrete molecular or cellular phenomenon." Second, "findings from the reductionist sciences differ relative to the integrative and organ systems sciences in their focus and generalizability to intact animals and organ systems." Third, integrative sciences represent a crucial component in biomedical experiments directed toward advancing the fight against debilitating and life-threatening diseases. Fourth, integrative sciences provide the infrastructure to support a wide variety of scientific fields including: physiology, pharmacology, toxicology, nutrition and developmental biology. The integrative sciences are, therefore, crucial supportive sciences. Fifth, integrative sciences are vital for discovery, validation and development of the research required to relate genes to complex functions and diseases. Sixth, the integrative sciences are necessary for drug

(continued on page 4)

**Figure 1. Global perspectives on status of Integrative/systems physiology: current status and supply/demand issues.**

Information obtained from the following sources:

- Life Sciences Research Office (Bethesda, MD, US)
- APS Survey of Chair persons of US Medical Schools
- American Association for the Advancement of Science
- National Science Foundation (US)
- IUPS Survey of Council and Scientific Commissions
- Commission of the European Communities
- UK Life Sciences Committee
- British Pharmacology Society
- Personal Communications (Industry and Academia)

development, including verification to establish relevance, identification of targets to pursue, and evaluation of therapeutic safety and efficacy issues prior to initiating phase I human clinical trials.

**Current Trends in US Physiology and Pharmacology** (Figure 3). The following information was obtained from three sources: the American Association for the Advancement of Science Report (AAAS) published in the journal *Science*; Dissertation Abstracts for the Integrative and Biomedical Sciences (1980, 1990, 2000); and the *American Journal of Physiology (AJP)* and the *Journal of Pharmacology and Therapeutics (ASPET)*. It is important to recognize that the surveys and questionnaires from which this data was obtained were based on the following definitions. "Reductionist Sciences" are defined as those "aimed at identifying molecular and cellular events, studied in purified form or in isolated systems and include genomics, proteomics, biochemistry and cell biology." "Integrative and Organ Systems Sciences" (IOSS) were broadly defined as "studies relying on animal models to provide specific tissues, individual organs or entire organ systems; and narrowly defined as "studies relying on animal biology to understand physiological function in the context of the entire animal, organ or organ systems model."

One way used to gain a perspective on the need for integrative and organ systems physiologists was to count the employment announcements appearing in ten random issues of *Science* over the last several decades. As summarized in Figure 4, compared to 1980, there has been nearly a doubling

**Figure 3. Current Trends in US Physiology and Pharmacology (AAAS Report in Science).**

Integrative and Organ System Sciences Employment Announcements (1982, 1991, 2000).

Dissertation Abstracts for the Integrative and Biomedical Sciences (1980, 1990, 2000).

*AJP* and *JPET* Integrative Publications Classifications (1980, 1990, 2000).

**Figure 4. Integrative and Organ System Sciences Employment Announcements Appearing in 10 Random Issues of Science.**

Year	Total Announcements	"Broad" Announcements	"Narrow" Announcements
1980	1,531	3.4%	.08%
1990	2,058	7.8%	1.3%
2000	3,377	4.1%	0.5%

**Figure 5. Dissertation Abstracts for Integrative and Biomedical Sciences in English.**

Year	Total Biomedical Dissertations	Total "Broad" Dissertations	Total "Narrow" Dissertations
1982	2,458	1,008 (41%)	422 (17%)
1991	4,870	1,481 (30%)	521 (11%)
2000	4,082	1,305 (32%)	262 (6.4%)

of the total job announcements in *Science* over the past 20 years. It is also clear that there has been proportionately only a very small increase (0.6%) in announcements advertising for individuals carrying out integrative and organs systems scientists (IOSS) as "broadly defined." At the same time, there has actually been a slight reduction (0.3%) in the percent of "narrowly defined" announcements seeking individuals who can carry out experiments and understand physiological function in the context of the entire organism. These data would suggest that academic institutions (largely within the US) at the beginning of the 21st century were not seeking to expand their faculties in the area of integrative systems physiologists.

**Dissertation Abstracts.** Figure 5 represents the total number of biomedical dissertations in English during this same time period (comparing years 1982, 1991, 2000). These data indicate that there has been a nearly 10% reduction in the percent of dissertations carried out in the area broadly defined as integrative systems biology and within the narrow IOSS definition of "research relying upon animal biology to understand function in the entire animal, organ or organ systems model." However, as reflected in the scientific journals of the APS and ASPET (Figure 6), the total number of articles consid-

ered as integrative systems biology has not changed nearly as drastically. For example, compared to 75% in 1980, currently 66% of the publications of the APS represent studies that rely on animal models (as broadly defined) and 45% are studies related to context of the entire animal organ or organ systems model down from 67% in 1980 (as narrowly defined). In contrast, it would appear that pharmacologists were carrying out considerably less research in the area of narrowly defined integrative systems sciences as represented by only 24% in the year 2000 compared to 43% in 1980 and 1990.

**Current status of Integrative and Organ Systems Scientists (IOSS) in the US.** The following information was obtained by LSRO from 163 (of the 414 departments) physiology and pharmacology departments in the United States with a response rate of 40%. It is encouraging that "US physiology and pharmacology department

**Figure 6. AJP AND JPET Integrative Publications Classifications.**

	Total Articles	"Broad"	"Narrow"
<i>AJP</i>			
1980	711	75%	67%
1990	1,406	77%	65%
2000	1,463	66%	45%
<i>JPET</i>			
1980	419	61%	43%
1990	534	73%	44%
2000	606	56%	24%

chairs overwhelmingly responded that IOSS approaches are important in maintaining academic scientific research programs." Eighty-three percent of the respondents thought there was an important need, 13% a qualified need, while only 4% thought there was no need for IOSS scientists. When queried if they "perceive this issue to be a problem," 124 chairs responded with written comments, 81% indicating it was an important problem. However, as seen in Figure 7, it was found that during the last decade of the 20th Century (1991-2001) there was an average reduction of 30% in faculty who could be defined as IOSS scientists in the United States, despite 20% of these departments reporting an overall increase in size. Among these departments, 38% also reported fewer full-time IOSS tenured faculty. It is remarkable that despite the feeling of a need for IOSS scientists and recognition that these scientists contribute to their departmental research efforts, 31.8% (41) of the respondents did not anticipate hiring IOSS scientists in their department in the next five years, and 24% (31) anticipated hiring no more than one. Conversely, 44.2% (57) did anticipate hiring more than one IOSS scientist over the next five years, suggesting that at the time of this survey (2002-2003), the majority of departments recognized the need and were making plans to hire IOSS scientists. Such projections in face of the aging of their current faculty in these areas of research are indeed rather feeble given the stated rele-

## Figure 7. Current Status of Integrative and Organ Systems Scientists (IOSS) in the United States.

Total faculty change from 1991-2001 reduced 30% (despite 20% reporting overall increase in size.)

38% report fewer full-time IOSS tenured faculty.

Only 22 programs (of 65) anticipate hiring limited number of faculty IOSS members within the next five years, despite increasing aging of current faculty.

(Collected from 163 Physiology and Pharmacology Departments with a response rate of 40% [LSRO]).

vance and important of such scientists. The reasons for not being more aggressive in hiring IOSS scientists most often stated were research funding, university support, and animal rights issues.

### Loss of Training Curriculum.

Regarding the state of training of scientists in the area of integrative and organ systems biology, 70.5% of the responding departments reported no change in IOSS courses since 1991, although it was unclear from the survey how often these courses were taught or how many students were involved in them. It was, however, also indicated that the organ systems courses suitable for graduate students had been reduced, eliminated or incorporated into significantly condensed courses. The 66 physiology and pharmacology departments that responded to this survey emphasized that there was currently a dramatic reduction in the competency of students capable of carrying out integrative and organ systems research. Specifically, 66 programs indicated that in 1991 they were training more than ten students capable of doing IOSS and in vivo whole animal research while in 2001 only 12 programs could make this statement.

The LSRO survey on the current status of integrative and organ systems scientists in the United States was summarized as follows.

Total number of faculty employed in physiology and pharmacology departments was unchanged for 76.7% of respondents.

Total number of IOSS faculty employed in physiology and pharmacology departments was unchanged for 52% of respondents, whereas 36.3% reported a decline in their numbers. Declining departments led increasing departments by more than 3:1.

Total number of tenured IOSS faculty employed in physiology and pharmacology departments was unchanged for 46.5% of respondents, whereas 38.1% reported a decline in their numbers.

Total number of non-tenured IOSS faculty employed in physiology and pharmacology departments was unchanged for 61.3% of respondents.

Total number of IOSS courses was unchanged for 70.5% of respondents, yet 75.8% of departmental chairs report dropping IOSS courses.

Total number of PhD students in physiology and pharmacology departments was unchanged for 74% of respondents.

Total number of PhD graduate students capable of conducting IOSS research in US physiology and pharmacology departments was unchanged for 59.7% of respondents, while 30.5% reported a decline. Declining departments led increasing departments by more than 2:1. The average number of PhD graduate students capable of conducting IOSS research in these departments has declined.

Demand for academic IOSS faculty in the next five years is not promising as 1.1 positions per department have been projected.

### International Union of Physiological Sciences (IUPS) Survey.

At the time the Life Sciences Research office was conducting the US survey on the current status and supply and demand issues of integrative/systems physiology, the IUPS also conducted an informal survey; a small sampling of eleven regions of the world represented by the council of the IUPS for the nations and regions using the same questionnaire as the Life Sciences Research Office for the US survey. Although, this survey is largely anecdotal and only a limited number of regions were surveyed, one can still obtain the flavor of what may be happening in these various regions of the world.

**United Kingdom.** The most informative response was received from the Life Sciences Committee of the United Kingdom (now the Biosciences Federation). This response went far beyond the survey questions since the national curriculum related to the education of integrative of systems scientists in the UK had just been independently explored by the Animal Science Group of the UK (the Life Sciences Committee). This report emphasized that within the national curriculum in the UK animal dissection is no longer a requirement in the A Level Biology practical assignment

and is no longer in the main body of the courses except for some demonstrations. The report reflected on the fact that course content has changed drastically over the past two to three decades from an emphasis on evolutionary integrative biology to “biomolecular” science, which they refer to as “modern bioscience.” It was stated that students “have little practical knowledge of animal form and function.” At the undergraduate level (BSc University Students) the focus of most syllabi is on non-whole animal topics. Commonly there is no dissection during undergraduate years.

The reasons for this situation were stated as follows:

Given the intense competition to register undergraduate students in science subjects, animal dissection was viewed as a disincentive to do so.

There has been a reduction in the laboratory component of Biology courses. This was attributed in part to reduced time allocated to teaching as the UK system moved toward the US semester system and modular degree programs.

There has been substantial Government cost cutting whereby staff/student ratios have been reduced and laboratory sessions that require considerable staffing have fallen by the wayside.

The use of animals for students doing honors projects has presented problems, as well, due to the fact that most Universities lack animal facilities, or if present, they are very expensive.

There are fears from animal rights groups and considerable bureaucratic delays and cost in order to obtain Home Office Education licenses.

Regarding the undergraduate level situation in the UK, students at many UK universities do not receive the education they need to make informed choice of future careers, which has contributed to the current chronic shortage of integrated systems scientists.

The supply and demand situation at the post-graduate level in the UK reflects some of the same problems. The shortage of such scientists is well recognized, but little has been done to address the problem. Efforts to recruit

such scientists have resulted in few, if any, applicants from the UK, and research is also hampered by a well-recognized major shortage of qualified animal technicians.

The reasons for the present situation in the UK were attributed to two major factors. First, the anti-vivisectionists have been very successful based on a long history of engaging in rigorous lobbying activities to local governments and parliament. They have created a climate of fear with many examples of extreme violence. There has been enormous pressure brought to bear on animal breeders to abandon business. The most publicized of these being the Huntingdon Life Sciences, a major drug testing company that was nearly bankrupt by the activities of the anti-vivisectionists. This climate of fear and intimidation has led to the delay and establishment of animal research centers such as the primate center in Cambridge. The second major reason for the present situation was attributed to the overall cultural changes that have occurred within the country. These changes include the increased urbanization of the population with loss of understanding of the realities of animal use. They include the increased awareness of environmental changes and a desire to prevent further erosion leading to increases in vegetarianism, antagonism against the use of furs for clothing, and a trend toward a preference for “natural foods” leading to changes in farming procedures.

What is being done to change this situation in the UK? As in many coun-

tries in the industrialized world, public opinion polls have supported animal experiments for biomedical research as needed. Efforts are being made in the UK to present the facts for the continued need for integrative and systems biology using whole animals. Funds for these activities can be obtained from the pharmaceutical industry and by medical organizations with progress in this field represented by the formation of the “campaign for medical progress” currently ongoing within the UK. There is also a recognized need to change the National Curriculum to consider ethics of animal experimentation in secondary schools and there is effort to change the curricula at all educational levels.

A separate report was sent by Sara-Jane Stagg representing the British Pharmacological Society that also conducted a survey relevant to the IUPS questionnaire. Most of the information was reflected in the report of the UK Life Sciences Committee, but the report placed greater emphasis on the concerns of the UK pharmaceutical industry regarding the manpower needs for integrative systems physiologists. It was emphasized that there is a rapidly diminishing number of undergraduates capable of carrying out hands-on in vivo laboratory studies. Industry is very concerned due to the difficulties of recruiting employees for in vivo work related to drug discovery. Industry has emphasized that even for those going to spend their life in molecular biology it was important to understand what colleagues do in vivo research and how it relates to the whole drug discovery process. The rea-

**Figure 8. Do the majority of the universities in your country have “integrative and organs systems scientist” faculty members? (IUPS)**

Country	Yes	No
Australia	X	X
New Zealand Physiological Society	X	
Chile		X
Scandinavian Physiological Society	X	
Danish National Committee	X	
Finnish Physiological Society	X	
France		X
India	X	
Japan Physiological Society	X	
Russia	X	
USA (Medical Schools)	X	

**Figure 9. Since 1990 has the number of such faculty members increased or decreased? (IUPS)**

Country	Decreased	Increased
Australia	X	
New Zealand	X	X
Chile	X	
Scandinavian	X	
Danish		X
Finnish	X	
France	no answer	no answer
Germany	X	
India		X
Japan	X	
Russia	X	
USA	X	

sons presented by the Pharmacological Society for the reduction in the opportunities for in vivo work were much the same as reflected by the UK Life Sciences Committee. This included cost of maintaining animal facilities in universities; the cost of providing the necessary training for undergraduates and the cost for government licenses; the cost and intrusiveness of the security necessary to protect such work from animal rights protesters; and the difficulty to find people to staff this work within the universities especially practical classes with animals that require high levels of supervision. Finally, the ethical problems with the use of animals were again cited.

Efforts are being made in the UK to address some of these problems. The British Pharmacological Society has invited pharmaceutical companies to contribute grants to departments that would assist in the cost of courses. This would include hands-on in vivo laboratory studies. They have received donations from six companies as of one year ago and the society also provides some funds. As of 2002 this pharmaceutical "partnership challenge" was providing grants to ten departments within the UK. The Pharmacological Society has joined with The Physiological Society and industry to develop two short vacation courses of one week's duration in London and Scotland where students will learn about in vivo pharmacology and physiology. In 2002 there were 70 applications and support for 27 places for these courses.

**IUPS overall survey results.** The next series of figures reflects the responses of the 12 countries and regions that were surveyed. It is evident from these overall responses that the majority of the universities within these regions still employ integrative and organs systems scientists among their faculty (Figure 8). However, since 1990 nearly all countries, with the exception of Denmark and India, indicate that they have experienced a decreasing number of IOSS faculty members within their universities (Figure 9). Furthermore, few foresaw a tendency within the next five years for additional hires (Figure 10), except Denmark, India and the USA. Regarding the courses offered in the curriculum within the universities, the responses suggest that some opportunities still exist within nearly every country for students to participate in a course that provides some level of integrative and organs sys-

tems science. However, when asked whether integrative and organs systems PhD students were capable of doing in vivo whole animal research, the answers were rather ambivalent (Figure 11), although the majority believed that most were indeed capable of this.

In response to the question regarding the future needs for IOSS scientists (Figure 12), it was indicated that in general there is an increasing demand for scientists trained to carry out integrative organs and systems research and teaching within their countries and regions, with two exceptions (Chile and Russia). With few exceptions, all of these countries believe that this is an important problem (Figure 13). Interestingly, the problem was viewed as both supply side and demand side, perhaps suggesting that at this time serious movement has not yet begun to rectify these needs. This is also reflected by the answers given to the question as to whether they foresee a tendency within the next five years for additional hires, with most of the countries responding in the negative (Figure 11.)

Anecdotal comments from our colleagues in industry. An effort was also made to survey the view of pharmaceutical and biotechnology industries. Unfortunately, the responses provided to the LSRO survey were insufficient for meaningful assessment. For this reason, I personally contacted some individuals from a number of companies who agreed to reflect their own personal views on the state of affairs

**Figure 10. Do you foresee a tendency within the next five years for additional hires? (IUPS)**

Country	Yes	No
Australia		X
New Zealand	X	X
Chile		X
Scandinavia		X
Danish	X	
Finnish		X
France	?	?
Germany		X
India	X	
Japan		X
Russia		X
USA	X (IUPS)	

**Figure 11. Are “integrative and organs systems PhD students” in general capable of doing in vivo whole animals research?**

Country	Yes	No
Australia	X	
New Zealand	X	
Chile		X
Scandinavia		X
Danish	X	
Finnish		Decreasing #s
France	?	?
Germany	X	X
India	X	
Japan	X	
Russia	X	
USA	X (IUPS)	

regarding manpower needs for integrative systems physiologists.

A summary of discussions with several scientists who have started Biotech Genome-based Discovery Companies concluded that pharmaceutical and biotechnology industries “now must outsource to Universities to move from target gene identification with a differential expression or phenotype in a gene knockout mouse to needing a proof-of-concept using an in vivo disease model-integrative physiologist/pharmacologist is needed for this.” Others shared similar opinions of pharmaceutical and biotechnology industries: Paul Vanhoutte (Servier, Belgium): “a great need but very few candidates;” Peter Morsing (Astra Zeneca): “now recognize a great need, but there are few candidates;” Mark Fishman (Novartis): “integrative biology is clearly important to

drug discovery;” and Bruce Markham (Pfizer): “a dearth of candidates now and a growing need.”

Global head of in vivo pharmacology and member of APS, Peter Thoren, MD, PhD, stated the following. “No doubt that the state of in vivo sciences in preclinical departments in Sweden is very unfortunate. Grants are much too small and the number of new graduates is too low. Until now, we have experienced no major problem in recruitment of ‘in vivo’ personnel but the future looks grim. I expect that we will get into major problems within a few years. The number of graduates goes down and many of the graduates do not have the broad knowledge in basic anatomy, histology, pharmacology and physiology as we used to recruit. Swedish students with a medical background seldom go into pre-clinical work any longer.”

Terry Oppenorth, (Abbott) believes that there is a shortage of in vivo scientists, which are at the top of the hiring list and this makes it difficult to recruit. However, in vivo people are coming from different backgrounds, which include gene knockout labs (primary training not in physiology or pharmacology) and MD degrees, to fill the positions. “If one has broad systems training there are great opportunities.”

**Conclusions.** It seems evident that there is at

this time a great need for the training of more scientists who can carry out physiological research in the context of the entire animal, organ, or organ system. These surveys indicate that the manpower needs for physiologists at the beginning of this 21st century are growing at both universities and in industry. Unfortunately, there is yet no tangible evidence that either is responding to these perceived needs. The great challenge within most countries and universities will now be to restructure curricula and research centers in ways that will stimulate new approaches and lead to the convergence of scientific experts needed to carry out integrative biological research. It would appear evident that to accomplish these goals, it will be necessary to change the ways in which we teach, carry out and fund science. This will require rethinking the ways in which the departments and research centers within our academic institutions are defined and integrated. Enormous opportunities will exist for those able to carry out research that can lead to levels of understanding of the integrated emergent properties of the living systems. More physiologists seem to be desperately needed, and we can only hope that more will soon become trained and that the current directions of science will indeed provide positions for them. ❖

**Figure 12. How do you estimate future needs for “integrative and organs systems scientists” in your country? (IUPS)**

Country	
Australia	Increasing demand
New Zealand	Increasing demand
Chile	Decrease
Scandinavia	Increasing demand
Danish	Increasing demand
Finnish	Increasing demand
France	Increasing demand
Germany	Increasing demand?
India	Unchanging
Japan	Increasing demand
Russia	Decrease everything
USA	Increasing demand

**Figure 13. Do you perceive this issue to be a problem? If so, what is the cause (e.g., a supply-side problem, a demand-side problem or both)? (IUPS)**

Country	
Australia	Yes-both supply/demand
New Zealand	Yes-both supply/demand
Chile	No-favor “molecular sciences”
Scandinavia	Yes-supply/demand inadequate
Danish	No-supply/demand adequate
Finnish	Yes-both supply/demand
France	Yes-both supply/demand
Germany	Yes-both supply/demand
India	No-supply/demand adequate
Japan	Yes-both supply/demand
Russia	Yes-both supply/demand
USA	Yes-both supply/demand



## APS Council Holds Fall Meeting in Florida

The APS Council held their fall meeting at the Hilton Sandestin Beach Golf Resort and Spa, Destin, FL, November 12-14, 2004. Council was presented with reports from the Publications, Finance, Membership, Education, Careers Committees, Communications, and Trainee Advisory Committee. APS staff members **Marsha Maytas, Robert Price, and Margaret Reich** joined the meeting to assist with the committee report presentations.

The Joint Program Committee presented a proposal for an APS Intersociety Meeting entitled *Comparative Physiology 2006: Integrating Diversity*. Comparative physiology is a broad field, ranging from molecular mechanisms of osmoregulation or nutrient transport to study of the evolution of physiological traits relevant to conservation biology, ecotoxicology, and biomedicine. The objective of the conference will be to exemplify this breadth of approaches and applications. Council approved the proposal for the conference.

The Publications Committee announced that **Jerome Dempsey**, University of Wisconsin, has been selected as the next editor of *Journal of Applied Physiology*. He will replace

**Gary Sieck** whose term will finish in June. The Committee also announced that nine articles have been published to date in the *Annals of Internal Medicine*. It was reported that 292 subscriptions to the Legacy Project have been sold and that the entire project is near completion. The Committee also reported that the Classic Articles web page was released in August (2004). The page includes links to the essays written about the articles, as well as a list of the classic articles. Both the essays and classic articles are completely free access. The Publications Committee also reported that they have revised *The Ethical Procedures Policy* so that it is easier to find specific guidelines about various ethical issues.

The Finance Committee presented Council with the final 2004 budget and the proposed 2005 budget, both of which were accepted and approved by Council.

The Education Committee reported that they are in the process of planning strategies to increase exposure of undergraduate students to physiology. These may include, but not be limited to increasing the number of undergraduate institutions that offer physiology as a major, focus, or minor/concentration; and developing methods

and materials to facilitate partnerships between medical physiology departments and undergraduate life sciences/biology departments to add new physiology courses or enrich existing courses. They have also started work on a website upgrade to allow online input of information from both graduate and undergraduate departments. The list of institutions granting degrees in physiology will be populated by updated entries and will be a searchable database. The Committee reported that they have also been working on a Medical Physiology Course Directors Resource Website. This website would bring together key resources to assist course directors in the development and conduct of medical physiology courses.

The Education Committee recommended that Council endorse the use of animal labs in physiology education. The Committee considered the usefulness of animal labs as well as other teaching options, such as simulations. Input into this discussion was provided by the Teaching Section, the editorial board of *Advances in Physiology Education*, and the Animal Care and Experimentation Committee. The consensus was that well-designed animal laboratories contribute a specific kind of active learning experience to physiology instruction. After some discussion, the Council adopted a position statement on the use of animals in education. This statement and supporting materials will be presented in a subsequent issue of *The Physiologist*.

The Council has begun planning for a Strategic Plan Meeting in fall 2005. A Member Needs Survey has been revised and updated and will be posted online in mid-January 2005. The survey will be web-based and the entire membership will be asked to complete the survey. The results of the survey will be used in the development of the new Strategic Plan.

Additional details of the Council's 2004 fall meeting will be presented to the membership at the 2005 APS Business Meeting. The Business Meeting will be held at the 2005 IUPS Congress on Monday, April 4 at 5:45 pm in the San Diego Convention



**Back row: Carole Leidtke, Kim Barrett, Thomas Lohmeier, Irving Zucker, Peter Wagner, Helen Raybould, Sue Barman, Curt Sigmund, Jeff Sands, Rob Carroll. Front row: Virginia Miller, John Williams, D. Neil Granger, Douglas Eaton, Dale Benos, Charles Tipton.**

Center, room 33. All APS members are invited to attend.

### Council Action Items

Council approved the new Ethical Procedures Policies.

Council approved continuing with the current hybrid model for *Physiological Genomics*.

Council approved the document "Guidelines to Sections: Raising Funds for Distinguished Lectureships."

Council approved the proposal from the Trainee Advisory Committee and Finance Committee for student dues with implementation to begin in 2006. Students will pay a discounted rate of \$10 for the first year of membership, and \$20 per year for the remaining four years of eligibility. Then their first year of regular membership will be free and a 50% discount will be applied to their membership dues for years two to four.

Council approved the recommendations of the Finance Committee accepting the 2004 estimated budget and approved the 2005 proposed budget.

Council approved a proposal for an APS Intersociety Meeting entitled *Comparative Physiology 2006: Integrating Diversity*.

Council unanimously approved a motion to transfer the following 10 regular members to emeritus membership status: **Jose Antunes-Rodrigues, Paul T. Cardeilhac, Oscar A. Carretero, Claude Desjardins, Adrian I. Katz, Frederick H. Leibach, Claude J. Migeon, Papineni S. Rao, Arthur**

**M. Spanier, and Melvin Weisbart.**

Council unanimously approved the requests of 11 regular members for reinstatement: **Peter Baluk, V. Courtney Broaddus, Ling Chen, Heng-Jie Cheng, James C. Delehunt, Christopher S. Garrard, Julia Marie Giger, and Stephen F. Vatner.**

Council approved the proposed outline of the Medical Physiology Course

Directors Resource Website.

Council approved the position statement on use of animals in teaching.

Council unanimously approved the selection of **David Bohr** as the 2005 Daggis Awardee.

Council approved selection of **Christin Carter-Su** as the Bodil Schmidt-Nielsen Awardee.

## Career Opportunities in Physiology Symposium "International Collaboration: Science Knows No Boundaries"

IUPS 2005  
Sunday, April 3, 5:45-7:45 PM  
Room 30B/C Convention Center

The need for intellectual cross-pollination has driven scientists to travel and communicate with peers in far-away lands. The skills and savvy needed to establish and maintain research collaborations across political and cultural boundaries are essential components to a successful career in science. While initial contact with international researchers should begin during graduate school and continue throughout one's career in science, learning when and how to initiate and sustain international collaborations is never easy. This symposium first aims to emphasize the personal and scientific benefits of international collaboration during all stages of professional life. Second, it will introduce the audience to agencies and organizations that promote and support scientific collaboration worldwide. This symposium will encourage international collaboration by highlighting the benefits and opening the door to various funding opportunities available worldwide. ❖

## APS Refresher Course "Integrating Genomics into Physiology Courses: A New Paradigm or Just More Information?"

IUPS 2005  
Friday, April 1, 8:00 AM -12:00 PM  
Room 30A, Convention Center

The genomics revolution has reached the point where the knowledge it produces is more and more relevant to the study of systems-level physiology. This is an exciting development that also presents a major challenge to educators involved in courses from the undergraduate to the graduate level. How are educators to integrate this new knowledge into physiology courses already overflowing

with content? Should they even attempt to incorporate this new dimension of systems physiology? This symposium seeks to address these questions by first defining the interface between genomics and physiology; that is, what is physiological genomics? The symposium then tackles the core issue of how to go beyond incorporating new individual pieces of molecular information into physiology courses, toward a totally new way of thinking about physiology that simultaneously considers the systems-level phenomena and patterns of gene expression and protein synthesis that underlie them. ❖

## New Regular Members

\*transferred from Student Membership

**Jonas Addae**

Univ. of the West Indies, West Indies

**Cindy Miller Anderson**

Univ. of North Dakota

**Terezia B Andradi**

Carl Gustav Carus Univ., Germany

**Stacy D. Beske\***

Univ. of Colorado

**Meixia Bi**

Wake Forest Univ., NC

**Samir Brahmachari**

Delhi Univ., India

**Russell D. Brown\***

Univ. of New South Wales, Australia

**Matteo Carandini**

Smith Kettlewell Eye Res. Inst., CA

**Isabelle G. De Plaen**

Children's Memorial Hosp, IL

**Barry Drust**

Liverpool John Moores Univ., UK

**Thomas E. Gustafsson**

Karolinska Inst., Sweden

**Lisa Ann Hernandez\***

Kosan Biosciences Inc.,

**Toshifumi Hibi**

Keio Univ., Japan

**Shigehisa Hirose**

Tokyo Inst Technology, Japan

**Eric P. Hoffman**

Children's Nat'l Med. Ctr., DC

**Karina Krotova**

Univ. of Florida

**Mara S. Ludwig**

McGill Univ., Canada

**Lisa Claire Mace\***

Vanderbilt Univ., TN

**Marek Marcinkiewicz**

Univ. of Virginia

**Chet Thomas Moritz**

Univ. of Washington

**Saleem Nicola**

Univ. of California, San Francisco

**Didier Y.R. Stainier**

Univ. of California, San Francisco

**Xuejun Wang**

Univ. of South Dakota

**Ryan Michael Yamka\***

Hill's Pet Nutrition Inc., KS

**Zhen Yan**

Duke Univ., NC

**Chun Yang**

La Jolla Inst. Allergy/Immunology, CA

**Sadiq A. Yusuf**

Ahmadu Bello Univ. Zaria, Nigeria

## New Student Members

**Wasiu A. Adegbesan**

Univ. of Lagos College of Med., Nigeria

**Babatunde O. Adigun**

Univ. of Lagos College of Med., Nigeria

**Misol Ahn**

Univ. of Washington

**Olumide O. Ajayoba**

Univ. of Lagos College of Med., Nigeria

**Oluwaseyi S. Akinola**

Univ. of Lagos College of Med., Nigeria

**Vance L. Albaugh**

Penn State Univ.

**Lacy M.A. Holowatz**

Penn State Univ.

**Angel Alvarez**

Univ. of Central Florida

**Adel Amirouche**

Fac De Medicine France

**Carina A.P.F. Andrade**

UNESP Sch. of Dentistry, Brazil

**Julie Antczak**

Medical College of Wisconsin

**Paul L. Aparicio**

Mass. Institute of Technology

**Michelle M. Arnhold**

Univ. of Minnesota

**Madeliene Atzeva**

Slippery Rock Univ., PA

**Elisa Babilonia**

New York Medical College

**Sara Babcock**

Univ. of Wyoming

**Kyunghwa Baek**

Texas A&M Univ.

**Nicole M. Baitz**

Case Western Res. Univ., OH

**Jonathan M. Beckel**

Univ. of Pittsburgh, PA

**Octavino J. Beltran**

Texas A&M Univ.

**Christina Bennett**

Univ. of Michigan

**Krystina M. Berg**

Virginia Commonwealth Univ.

**Kimberly J. Berry**

National Center for Toxicol Res., AR

**Sydella Blatch**

Arizona State Univ.

**Salil Bose**

Univ. of Texas Med. Branch

**Sofiane Boucetta**

Laval Univ., Canada

**Manuel M. Buitrago Blanco**

Hertie Inst., Germany

**Aaron J. Camp**

Univ. of Newcastle, Australia

**Peiyong S. Chan**

Univ. of Florida

**Yang-Ling Chou**

Univ. of Florida

**Richard J. Clarke**

Univ. of Pittsburgh, PA

**Ricka D. Cooper**

Univ. of Connecticut

**Nathan P. Cramer**

Univ. of Maryland, Baltimore

**Elizabeth Crittenden**

Texas State Univ.

**Vivek Dahawan**

Univ. of Alberta, Canada

**Gerard A. Daly**

Boston College, MA

**John Dicecco**

Univ. of Rhode Island

**Alison Digney**

Mental Health Res. Inst., Australia

**Goma Dogonyaro**

Ahmadu Bello Univ., Nigeria

**Timothy L. Domeier**

Yale Univ, CT

**Laura C. Duling**

Univ. of New Mexico

**Brennan D. Eadie**

Univ. of British Columbia, Canada

**Remare R. Ettarh**

Univ. of Lagos, Nigeria

**Anna G. Euser**

Univ. of Vermont College of Med.

**Yuan Fan**

Baylor College of Medicine, TX

**Ruth M. Foutz**

Univ. of Nebraska Med. Ctr.

**Carmen Frias**

Nat'l Univ. of Mexico

**Strawberry Gatts**

Univ. of Oregon

**Oguz Gozen**

Ege Univ. Sch. of Med., Turkey

**Torrance T. Green**

Tulane Univ, LA

**Paul R. Grimm**

Univ. of Nebraska Med. Ctr.

**Minjie Gu**

Columbia Univ., NY

**Farid Hamzei**

SUNY, Downstate, NY

**Rachael M. Hannah**

Univ. of Vermont

**Emma Hart**

Brunel Univ., West London, UK

**Travis Harvey**

Baylor Univ., TX

**Matthew R. Hayes**

Penn State Univ.

**Jennifer M. Head**

Univ. of Oregon

**Brooke C. Henderson**

Univ. of Louisville, KY

**Myriam Hoffmann**

Univ. of Pittsburgh, PA

**Jennifer Holzman**

Emory Univ., GA

**Bang-Gee Hsu**

Buddhist Tzu Chi Gen. Hosp., Taiwan

**Imaralu Ikuenobe**

Ambrose Alli Univ., Nigeria

**David Jegger**

Ecole Polytech, Fed De Lausanne,  
Switzerland

**Sarah M. Jones**

Georgia Inst. of Tech.

**Subesh B. Kampalli**

Kansas State Univ.

**Abere B. Karibi-Ikiriko**

Howard Univ. College of Med., DC

**Ranjita J. Kokje**

Univ of Mississippi

**Erik Mason Kolb**

Univ. of California-Riverside

**Maria A. Kraemer**

Mayo Clinic College of Med., MN

**Frantz-Daniel Lafortune**

Laval Univ., Canada

**Chunying Li**

Medical College of Georgia

**Ju Lu**

Harvard Medical School, MA

**Judith M. Lytle**

Georgetown Univ., DC

**Ganesh Manogarane**

Sir Ramachandra, Med. Coll., India

**Lesley Maskell**

Peninsula Medical School, UK

**Mukti Mehta**

CUNY, NY, NY

**Rebecca L. Miller**

Univ. of Missouri

**Michael W. Nestor**

Univ. of Maryland School of Med.

**Loretta Ogbewey**

Univ. of Lagos Coll. of Med., Nigeria

**Robert O'Hagan**

Columbia Univ., NY

**Lisandra B. Oliveira**

UNESP School of Dentistry, Brazil

**Daniel A. Paredes**

Univ. of Florida College of Med.

**Janelle S. Pryor**

Univ. of Mississippi Med. Ctr.

**Sandra A. Richardson**

Dartmouth Medical School, VT

**Enrique Rodriguez-Borrero**

Univ. of Puerto Rico

**Araya Ruangkittisakul**

Univ. of Alberta, Canada

**Manning Sabatier**

Univ. of Georgia

**Alejandro Salah**

SUNY Downstate, NY

**Sovan Sarkar**

Univ. of Cambridge, UK

**Angela Marie Seliga**

Boston Univ, MA

**Nicholas P. Shapiro**

Georgia Inst. of Tech.

**Phullara B. Shelat**

Univ. of Missouri, Columbia

**Jin Song**

Univ. of South Dakota

**Jacob G. Swan**

Dartmouth College, NH

**Runping Wang**

Georgia State Univ.

**Louisa Mei-Chen Wang**

Univ. of California, LA

**Kelly Warren**

SUNY, Stony Brook, NY

**Anna M. Watson**

Howard Florey Inst., Australia

**Randy K. Weinstein**

Georgia Tech.

**Michael A. Whitehorne-King**

Kings College Hosp., UK

**Scott A. Wilke**

Univ. of California, San Diego

**Katherine A. Wilkinson**

Univ. of California, San Diego

**Wai Hong C. Woo**

Univ. of Manitoba, Canada

**Mary Beth Wood**

Univ. of California, Davis

**Bajeevalochan WudaLi**

Boston College, MA

**Fei Xu**

UMDNJ

**Yuchun Zhang**

Indiana Univ. Sch. of Med.

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## New Affiliate Members

**Brenda E. McCracken**

Eastern Washington Univ.

**Joshua Balsam**

Baylor College, TX

**LeiLing Chen**

Yale Univ., CT

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## Recently Deceased Members

**Cosimo Ajmone-Marsan**

Miami, FL

**Norman R. Alpert**

Burlington, VT

**Ingrith J. Deyrup-Olsen**

Seattle, WA

**Isidore S. Edelman**

New York, NY

**Sidney Goldring**

St. Louis, MO

**Gilbert S. Greenwald**

Kansas City, KS

**Yael Harari**

Houston, TX

**Ancel Keys**

Minneapolis, MN

**A.S. Paintal**

Delhi, India

**John Vane**

London, UK

**A. Stanley Weltman**

West Palm Beach, FL

## Nasjletti New Editor of *AJP-Heart and Circulatory Physiology*

**Alberto Nasjletti**, MD, Professor of Pharmacology at New York Medical College in Valhalla, succeeds **David Harder** as Editor-in-Chief of the *American Journal of Physiology-Heart and Circulatory Physiology*, in January 2005. Nasjletti earned an MD degree from the School of Medicine of Universidad Nacional de Cuyo of Mendoza, Argentina, in 1965. He received postdoctoral training under the mentorship of J.C. Fasciolo in the Department of Pathophysiology at the School of Medicine of Universidad Nacional de Cuyo, and G.M.C. Masson at the Research Division of the Cleveland Clinic Foundation in Cleveland, OH. In 1971, he joined the faculty of the Department of Pharmacology of the Medical College of Wisconsin in Milwaukee, WI. Subsequently, in 1975, he was appointed Associate Professor of Pharmacology at the University of Tennessee Center for the Health Sciences in Memphis, and was promoted to Professor of Pharmacology in 1979. He assumed his current position at New York Medical College in 1987.



**Alberto Nasjletti**

Nasjletti has been a member of the American Physiological Society since 1972. He has served as Vice Chair, Chair and Immediate Past Chair of the American Heart Association Council for High Blood Pressure Research, as well as on various committees of the American Society of Hypertension and the Interamerican

Society of Hypertension. He was an Associate Editor of *AJP-Heart and Circulatory Physiology* and serves or has served on the Editorial Boards of *Hypertension*, the *Journal of Hypertension*, and the *American Journal of Hypertension*. He also has served on various research review panels of the National Institutes of Health and the American Heart Association.

Nasjletti's research focuses on the role played by vasoactive hormonal systems in the regulation of blood pressure in normotensive and hypertensive settings. He has authored over 190 research papers, and has been funded continuously by the National Institutes of Health since 1973. Nasjletti was awarded the Harry Goldblatt Award of the American Heart Association in 1987, and has presented the American Heart Association Lewis K. Dahl Memorial Lecture in 1996, the American Heart Association Arthur Curtis Corcoran Memorial Lecture in 1997, the Harold F. Hardman Lecture of the Medical College of Wisconsin in 2000, and the Mayerson-Di Luzio Lecture of Tulane University in 2004. ❖

### APS Elections!

The American Physiological Society 2005-2006 elections are coming in February. The election of the APS President-elect and Councillors will occur electronically using a web-based election program. Regular members in good standing will receive their ballot notification electronically in February. Voting closes February 28

You will have the opportunity to vote for one of the following candidates for President-elect and for two of the following candidates for Councillor, as put forward by the Nominating Committee.

#### For President-Elect

Dale Benos  
J.R. Haywood

#### For Councillor:

Kenneth Baldwin  
Susan Barman  
Robert G. Carroll  
Irving Joshua  
Bruce Lindsey  
Gary Sieck

## 2004 APS Translational Research Conference Immunological and Pathophysiological Mechanisms in Inflammatory Bowel Disease September 8-11, Snowmass Village, CO

The 2004 APS Translational Research Conference Immunological and Pathophysiological Mechanisms in Inflammatory Bowel Disease (IBD), was held at the Snowmass Conference Center, nestled minutes from the ski slopes of Snowmass. As the leaves turned into fall colors at the tranquil resort, a group of interdisciplinary investigators discussed the latest treatments in experimental and clinical IBD. The Organizing Committee, chaired by **Matthew Grisham**, LSU Health Sciences Center, Shreveport, and **Fabio Cominelli**, University of Virginia Health System, selected and arranged the scientific sessions. In between the symposia and poster sessions, attendees took advantage of taking in the beautiful scenery, hiking, wandering through the authentic shops of the Snowmass Village Mall or driving into nearby Aspen.

The conference was attended by 119 total registrants, of which young scientists, including 16 postdoctoral and six students, represented 18% of registrants. Eight attendees were APS members (7%) and 59 were not APS members (50%). Invited speakers and chairs made up the remaining 30 registrants (25%). This meeting attracted registrants from outside the United States. Out of the 119 registrants, 14 represented countries from Europe, Asia and Australia (12%). There were also four scientists at the meeting from Canada (3%). Table 1 shows the breakdown of the different registration types.

The IBD meeting opened with a Keynote Lecture presented by **Daniel Podolsky** and was followed by an Opening Reception. The program covered six symposia sessions over the course of the meeting, where a wide range of topics were discussed. Participants in the audience were encouraged to share their ideas and thoughts with lecturers on the topics. During the meeting there were two poster sessions and socials where the scientists were able to present their work. There were a total of 50 poster presentations programmed for the

meeting. Of all of the abstracts that were submitted for the meeting, 16 had a female first author (32%); 13 (26%) of abstracts were from institutions outside of the United States, including two from Canada. Table 2 shows the departmental affiliations of authors who submitted an abstract.

The awards presentation recognized 18 recipients of the Research Recognition Award for Outstanding Abstract Presentation by a Graduate Student or Postdoctoral Fellow. The following awardees were presented with a certificate and cash prize: **Jing Li**, University of Chicago; **Eva Galka**, Penn State University; **Xiaonan Han**, Cincinnati Children's Hospital Medical Center; **Jesus Rivera-Nieves**, University of Virginia Health Science Center; **Takanori Kanai**, Tokyo Medical & Dental University; **Ossama Hatoum**, Medical College of Wisconsin; **Kevin Pavlick**, LSU Health Sciences Center; **Silvio Danese**, Case Western Reserve University; **Yuji Naito**, Kyoto Prefectural University of Medicine; **Robert Edwards**, University of California, Irvine; **Kevin Scott**, University of Virginia; **Willem de Villiers**, University of Kentucky; **Geraldine Canny**, Brigham & Women's Hospital; **Brian Dieckgraefe**, Washington University School of Medicine; **Lillian Maggio-Price**, University of Washington; **Thorsten Vowinkel**, LSU Health Sciences Center; **George Bamias**, University of Virginia; and **James Versalovic**, Baylor College of Medicine. In addition, **Gerardo A. Hernandez Buitrago** and **Carmencita Rojas Cartagena**, both students at the Ponce School of Medicine in Puerto Rico, were the recipients of the Porter Physiology Development Committee's Minority Travel Fellowship Award, which are provided to encourage participation of under-represented minority students. With support from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and the National Institutes of General

Medical Sciences (NIGMS) the fellowship provides reimbursement of all expenses associated with travel and participation in the conference. The recipient is matched with an APS member attending the conference who offers guidance and makes introductions to the other scientists.

The American Physiological Society and the Organizing Committee gratefully acknowledges the financial support provided through generous educational grants from Centocor, Inc., Crohn's & Colitis Foundation of America, NIH-NIDDK, and Hoffmann-La-Roche, Inc. ❖

**Table 1. Registration Statistics**

Registrant Type	Number of Attendees (%)
APS Member	8 (7%)
Nonmember	59 (50%)
Postdoctoral	16 (13%)
Student	6 (5%)
Invited Speaker	30 (25%)
<b>Total</b>	<b>119</b>

**Table 2. Breakdown of Departments that Submitted Abstracts**

Department	Number of Abstracts (%)
Gastroenterology	11 (28%)
Medicine	8 (15%)
Pathology	7 (13%)
Molecular and Cell Biology	5 (9%)
Physiology	3 (5%)

## 2004 APS Intersociety Meeting The Integrative Biology of Exercise October 6-9, Austin, TX

Set in the heart of downtown Austin, the newly built Hilton Austin Hotel served as the meeting location for the 2004 APS Intersociety Meeting: The Integrative Biology of Exercise. Intersociety Meetings are held every four years and offer concurrent symposia and exhibits. This meeting was organized by **Ronald Terjung** (Chair), University of Missouri-Columbia, **Laurie Goodyear**, Harvard Medical School, **Robert Grange**, Virginia Tech University, **James Hicks**, University of California, Irvine, **Michael Lindinger**, University of Guelph, **P. Darrell Neuffer**, Yale University, **Bente Pedersen**, Rigshospitalet, **Jack Rall**, Ohio State University, **Brenda Russell**, University of Illinois, Chicago, **Kenneth Baldwin**, University of California, Irvine and **Steven Segal**, John B. Pierce Laboratory, Yale University. The program for this meeting covered recent advancements in the exercise research area as well as emerging topics.

This exciting meeting attracted 606 total registrants, including a good presence of young investigators and students. The young investigators and students accounted for 47% of the total registrants. APS members made up 23% of the attendees, closely followed by non-members (11%) and sponsoring societies (8%) attendees respectively. Invited speakers and chairs represented the remaining 11%. This meeting

also had a large international presence with some participants coming for the first time to the United States and their first meeting.

Out of the 606 registrants, 11% of registrants came from Canada, 10% of registrants represented countries from Europe and the remaining 8% from Australia, Japan, Brazil and South Africa. Table 1 (below) shows the breakdown of the different registration types.

The meeting opened with an informal Opening Reception, which gave participants the opportunity to network and catch-up with colleagues while enjoying some delicious hors d'oeuvres. The meeting program allowed for two concurrent symposia each morning and afternoon, with a total of twelve symposia, at which many interesting and exciting issues were presented. There was also active participation from the audience, who were encouraged to ask questions or make comments.

The three day meeting also included three separate poster sessions. During these sessions, established scientists and student attendees presented their abstract work to their colleagues and peers. There were a total of 337 programmed abstracts for the meet-



**Banquet speaker, Bengt Saltin, surrounded by members of the IBE Organizing Committee chaired by Ron Terjung.**

ing. Out of the abstracts that were submitted, 19% had a female first author; 16% of the submitted abstracts came from countries in Europe, closely followed by Canada with 13%.

During the meeting there was an option for registrants to purchase tickets to the Salt Lick BBQ restaurant for an evening of socializing and relaxing. Located about 45 minutes from downtown Austin, the ranch style restaurant boasts some of the best barbecue in Texas. Cooked over an open flame fire grill, participants enjoyed all-you-can-eat chicken, ribs, beef brisket and all the traditional barbecue side dishes, while listening to a live country and western band.

The meeting closed with a Banquet and Awards Presentation, where the organizing committee presented the winners of the Research Recognition Award for Outstanding Abstract



**Several of the Research Recognition Award winners accepting their awards at the closing banquet.**

**Table 1. Registration Statistics**

Registrant Type	Number of Attendees (%)
APS Member	141 (23%)
Nonmember	65 (11%)
Postdoctoral	72 (12%)
Student	210 (35%)
Invited Speaker	68 (11%)
Sponsoring Societies	50 (8%)
<b>Total</b>	<b>606</b>

Presentation by a Graduate Student or Postdoctoral Fellow a certificate and cash prize. The winners of the award were: **Eric B. Taylor**, Brigham Young University; **Chad Hancock**, University of Missouri-Columbia; **Anne Cecile Durieux**, Unite PPEH; **Soo Kim**, University of California, Los Angeles; **R. Andrew Shanely**, University of Missouri-Columbia; **Takayuki Akimoto**, Duke University Medical Center; and **Carol A. Witzak**, Joslin Diabetes Center.

In addition, the following were the recipients of the Porter Physiology Development Committee's Minority Travel Fellowship Award, which are provided to encourage participation of under represented minority students: **Christopher Mendias**, University of Michigan; **Phillip Palmer**, Meharry Medical College; **Rhonda Prisby**, Texas A&M University; **Karma Rabon-Stith**, University of Maryland, College Park; **James Recinos**, California State University,



Attendees mingle and discuss the poster presentations of their colleagues.

Northridge; **William Richards**, Ohio State University; and **Alberto Vallejo**, University of Southern California. With support from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), the fellowship provides reimbursement of all expenses associated with travel and participation in the conference. The recipient is matched with an APS member attending the conference that offers guidance and makes introductions to the other scientists.

**Bengt Saltin**, University of Copenhagen, was the Banquet Speaker, presenting unique insights into his life as a scientist and the mentors that influenced him in a presentation entitled "My Link to the Founders."

The American Physiological Society and the Organizing Committee gratefully acknowledges the financial support provided through generous educational grants from NASA, United States Army Research Institute of Environmental Medicine, NIAMSD, Gatorade Sports Sciences Institute, and Pfizer. The American Physiological Society also wishes to thank the co-sponsors, the American College of Sports Medicine and the Canadian Society for Exercise Physiology for their support of this meeting. ❖

## FASEB Summer Research Conference New Insights in Polycystic Kidney Diseases: Molecular Pathways, Pathogenic Mechanisms, and Translational Applications

### Conference Topics:

- The Functional Role of Cystoproteins in Epithelial Differentiation
- Epithelial Polarity, Transport, and Cell Signaling: The Role of Cystoproteins
- Cilia/Centrosomal Dysfunction and PKD Pathogenesis
- PKD Pathways: Lessons from Comparative Genomics
- PKD as a Complex Trait
- Other Cystic Diseases and Convergent Pathways
- PKD: Extra-Renal Disease
- Biomarkers for Disease Progression
- Innovative Targeting in PKD Therapeutics.

**Dates:** August 6-11, 2005 in Saxtons River, VT  
**Information:** <http://src.faseb.org>



## APS Archive of Teaching Resources



The APS Archive of Teaching Resources (<http://www.apsarchive.org>) continues to grow with the recruitment of a variety of new learning objects from educators all over the country. To date, there are over 700 items catalogued in the Archive from various sources.

However, more material is still needed. Please consider submitting material that you have developed to use to make your teaching more effective. These can be

**lecture or course outlines or PowerPoint slides** from a lecture that is particularly effective with your students

**problems or cases** you've written for your classes

**diagram(s)** that you've created to illustrate a specific pathway or process that seems to clarify it for your students

**simulations or videos** you have developed

**web sites** you have discovered that have valuable information for your teaching

**teaching tools/materials** that you are developing that

would benefit from feedback from your colleagues

**anything educational** related to physiology, pathophysiology, or clinical physiology

By submitting learning objects that you have developed, you can help your colleagues in their efforts to find the best tools for introducing their students to the exciting discipline of physiology.

Here are some new items in the Archive contributed by APS and its first Archive Partner, the Human Anatomy and Physiology Society (HAPS). Take a moment and check out those that are most relevant to your teaching. Don't forget that you can comment on any of these items through the comment section attached to each item, which can be found on its Fact Sheet. ❖

### APS Additions

*Reading Primary Literature in Biology* (web site)

**Christopher M. Gillen**

*Understanding Feedback Loops* (Analogy)

**Barbara E. Goodman**

*CFTR: Where It Is Found and What It SHOULD Do* (PowerPoint)

**Barbara E. Goodman**

*An Educational Tool for Understanding the Cardiovascular Adjustments to Upright Posture* (text)

**Michelle M. Masterson**

*Mass and Heat Flow* (simulation)

**Harold I. Modell**

*How to tell heart rate from an ECG?* (PowerPoint and notes)

**E.S. Prakash**

*Temperature Regulation* (PowerPoint, lecture outline, and handout)

**Thomas A. Pressley**

In addition, the "Physiology in Medicine" articles, published jointly by APS and *Annals of Internal Medicine*, have been catalogued in the Archive.

*The Physiologic Basis of High-Altitude Diseases*

**John B. West**

*The Acute Respiratory Distress Syndrome*

**Claude A. Piantadosi and David A. Schwartz**

*Alzheimer Disease: Mechanistic Understanding Predicts Novel Therapies*

**Dennis J. Selkoe**

*Pain: Moving from Symptom Control toward Mechanism-Specific Pharmacologic Management*

**Clifford J. Woolf**

*Following the Molecular Pathways toward an Understanding of the Pathogenesis of Systemic Sclerosis*

**Sergio A. Jimenez and Chris T. Derk**

*Pathogenesis of Hypertension*

**Suzanne Oparil, M. Amin Zaman, and David A. Calhoun**

*How Do Corticosteroids Work in Asthma?*

**Peter J. Barnes and Ian M. Adcock**

*The Thermogenic Effect of Thyroid Hormone and Its Clinical Implications*

**J. Enrique Silva**

*A Physiologic Approach to Diagnosis of the Cushing Syndrome*

**Hershel Raff and James W. Findling**

*Malignant Glioma Physiology: Cellular Response to Hypoxia and Its Role in Tumor Progression*

**Daniel J. Brat and Timothy B. Mapstone**

## Awards Presented at Annual Biomedical Research Conference for Minority Students

The APS presented awards to minority undergraduate researchers and was a major conference sponsor at the Annual Biomedical Research Conference for Minority Students (ABRCMS) at the Hyatt Regency in Dallas, TX from November 10-13, 2004. ABRCMS is a national conference designed to facilitate increased minority involvement in biomedical science careers. According to ABRCMS, approximately 2,400 individuals, including 1,600 undergraduate/graduate students, and 900 faculty and administrators attended this meeting.

The APS, represented by Education Office staff member **Brooke Bruthers**, was pleased to present \$250 awards to eight undergraduate students for the best poster presentations in physiology during the conference. Thirty judges, including APS members, **Margaret Colden-Stanfield**, Morehouse School of Medicine, **Cary Cooper**, University of Texas Medical Branch, and **Barbara Horwitz**, University of California-Davis, selected the winners:

### Best Sophomore Poster Presentations

**Christopher Hamm**, Morehouse School of Medicine, Atlanta, GA; Abstract Title: "Induction of CYP3A4 by Herbal Components in Human Hepatocytes Cultures;"

**Qwan Michelle Turton**, Wayne Community College, Goldsboro, NC; Abstract Title: "The Effects of 17 $\beta$ -estradiol on Zebrafish Angiogenesis."

### Best Junior Poster Presentations

**Garrett Mann**, Morehouse School of Medicine, Atlanta, GA; Abstract Title: "Effect of Eplerenone on Salt-Induced Hypertension in Dahl Salt-Sensitive Rats;"

**Latoya Poole**, Fayetteville State University, Fayetteville, NC; Abstract Title: "Paraquat Sensitivity Assay of MnSOD and Cu/ZnSOD Double Mutant."

### Best Senior Poster Presentations

**Mario Ball**, Morehouse College, Atlanta, GA; Abstract Title: "The Use of Orthogonal Images to Measure In-vivo Knee Joint Kinematics;"

**Jose Figueroa**, University of Houston, Houston, TX; Abstract Title: "Pharmacological Manipulation of the

Pupillary Light Response in the Syrian Hamster;"

**Mario Penzo**, Universidad Central del Caribe, Bayamon, PR; Abstract Title: "Neuroprotection by 4R-cembra-triene-diol through the  $\alpha_4\beta_2$  Nicotinic Receptor is mediated by Activation of the Akt/PKB Pathway;"

**Sheryl Sands**, Spelman College, Atlanta, GA; Abstract Title: "Histamine H<sub>2</sub> Receptors Mediate the Histamine Response in Cultured Guinea Pig Gallbladder Epithelial Cells."

The APS congratulates the students on a job well done and wishes them the best in their academic pursuits.

The APS Education office also staffed an exhibit booth, highlighting the following awards, programs and resources for minority groups under-represented in science:

**APS/NIDDK Minority Travel Fellowship**, providing travel support for 50-70 students annually. This fellowship provides funds to attend Experimental Biology and the fall APS conferences. Awardees also are paired with a mentor, an APS member, in their area of research. The intent of this program is to increase participation of pre- and postdoctoral minority students in the physiological sciences.

**Undergraduate Summer Research Fellowship**, supporting up to 12 fellowships each year. Fellowships support full-time undergraduate students to work in the laboratory of an APS member. The goal of this program is to excite and encourage students to pursue a career as a basic

research scientist.

**Explorations in Biomedicine Undergraduate Summer Research Fellowship**, which immerses Native American undergraduates from across the nation in the world of cutting-edge physiology and biomedical research for 8-10 weeks during the summer. The Fellowship also provides the student an opportunity to participate in a major scientific meeting to experience the different ways science is communicated.

**Porter Physiology Fellowship Program**, supporting minority students pursuing full-time studies toward a PhD in the physiological sciences.

The new Career brochure and updated Career web site, the Archive of Teaching Resources, the new Timeline of Physiology, free membership for students, and IUPS 2005 also were provided for participants.

The ABRCMS meeting is sponsored by a grant from the National Institute of General Medical Sciences (NIGMS) Minority Opportunities in Research (MORE) and is coordinated by the American Society for Microbiology. For more information see <http://www.abrcms.org>. For more information regarding the awards, programs and fellowships administered by the APS Education Office, please visit <http://www.the-aps.org/education/index.htm> or contact the office at [education@the-aps.org](mailto:education@the-aps.org) or 301-634-7132. ❖



APS staff member Brooke Bruthers presents awards to the best poster presentation awardees.

## Developing and Implementing a Communications Strategy: The Basics for the Basic Scientist Four Views on Getting Attention for Your Research

### *Introduction*

**3:15-3:20** – **Hannah Carey**, Univ. of Wisconsin School of Veterinary Medicine

### *Part 1 – Identifying and Refining Your Research Message*

**3:20-3:40** – Speaker TBA

### *Part 2 – Disseminating Your Research Message*

**3:40-4:00** – **Gale Davy**, Executive Director of the Wisconsin Association for Biomedical Research and Education

**4:00-4:20** – **Robert Nellis**, Research Communications Director at the Mayo Clinic

**4:20-4:40** – **Mayer Resnick**, APS Communications Officer

### *Q&A Session*

**4:40-5:10**

### *Wrap-Up*

**5:10-5:15** – Hannah Carey, University of Wisconsin School of Veterinary Medicine

For its third symposium, the Communications Committee will address how basic scientists can be proactive in promoting their research. The first part of the discussion centers on the definition of newsworthiness and how scientist can frame their research in a way that will pique reporter interest. The second section involves working with organizations that can assist researchers in promoting their science.

Part 1 will feature a health and medical journalist who will discuss what reporters look for in research studies and how they define newsworthiness. This section will increase understanding of what qualifies as newsworthy, and will ideally assist scientists in framing their research in a way that will attract media attention.

Part 2 will feature representatives from organizations that can help basic scientists to promote their research. State societies for biomedical research, institutional public relations departments and scientific societies have a vested interest in publicizing science news. They are also likely to have standing media contacts and science distribution outlets that look to them as a regular information source. The speakers will discuss how they work with their membership to publicize scientific research and the methods they have found particularly effective to spark media interest in science news.

The goal of this symposium is to equip scientists with the ability to craft messages about their research and identify vehicles to help with research dissemination. The symposium is open to all members and will be held on Monday, April 4, 2005 from 3:15 – 5:15 PM in San Diego Convention Center Room 29C. ❖

Participants must be registered EB/IUPS attendees and are asked to submit their name, institution, email, mailing address and past experiences with the media to [com-moff@the-aps.org](mailto:com-moff@the-aps.org). Questions can be directed to Stacy Brooks in the APS Communications Office (301-634-7253; [sbrooks@the-aps.org](mailto:sbrooks@the-aps.org)).

## Biomedical Research: Advocacy Needed

On December 6, 2004, Congress finalized the Fiscal Year (FY) 2005 omnibus appropriations bill that includes funding for the National Institutes of Health (NIH), the National Science Foundation, Veterans Affairs, and NASA (see sidebar). In anticipation of the President's FY 2006 budget and the upcoming appropriations process, it is important to consider how to advocate for increased research funding in a time of fiscal constraint. This article will outline ways for scientists to become involved in the advocacy effort and communicate the importance of funding biomedical research.

The most important thing that researchers can do is explain scientific research and the impact that it has on society. While physiologists are clearly familiar with how basic science discoveries lead to a better understanding of health and disease, the connections are not as clear to members of the public and the people making funding decisions in Washington.

### How to explain science: starting points

The press regularly focuses on the latest medical and drug discoveries because they relate to common medical problems that face patients today. Beyond the headlines, however, there are often intriguing stories that show the important role of government-supported basic research performed at academic institutions. One way to build greater appreciation for basic science is to make people aware of the science behind the breakthrough. FASEB has written a series of articles called *Breakthroughs in Bioscience* tracing the science behind important health innovations. These articles are available on the FASEB website at <http://www.faseb.org/opa/break/>.

Using examples from your own research is also very effective in conveying the importance of science. Research requires the kind of commitment that is inspired by a true love of science, and sharing that with the public can be very powerful. In addition, understanding what actually

goes on in the research labs can demystify the need for funding.

Thirdly, certain basic physiological discoveries that have had major impacts on the way we think about science and biology have been highlighted in the Classic Papers in Physiology

series published by the *American Journal of Physiology (AJP)* (<http://www.the-aps.org/publications/classics/>). Below are descriptions of a few of these findings from this series, which looks back at the last hundred years of physiology research. While

## FY 2005 Funding Approved

In early December, Congress finalized an omnibus appropriations bill to fund government agencies for the 2005 fiscal year. In an effort to curb federal spending, Congress sought to hold all non-defense discretionary spending to FY 2004 levels, with overall spending held to no more than a 1% increase. In order to accomplish this goal and still fund Congressional and White House priority programs, all non-defense and non-homeland security appropriations were subject to a 0.8% across-the-board cut. Included in the \$388.4 billion spending bill was funding for biomedical research programs at the NIH, NSF, VA and NASA.

### National Institutes of Health (NIH)

In the second year following the completed doubling of the budget, NIH was provided with a \$28.8 billion appropriation. However, the budget will only be \$28.6 after the 0.8% cut. This sum will be further subjected to a 2.4% transfer of funds to other public health service (PHS) programs, leaving approximately \$27.9 billion available for programs. This "tap" is spent at the discretion of the Secretary of HHS, and in recent years, the percentage transferred from NIH to other PHS programs has steadily increased from 1.25% originally, to 2.4% currently.

The NIH's \$27.9 billion appropriation represents a 2% increase in funding over its FY 2004 budget, which is significantly below the projected inflation rate for biomedical sciences (currently 3.5%). The impact that the limited increase in funds will have on new grants is not yet clear, but it is estimated that the money lost from the 0.8% cut and 2.4% fund transfer alone would have funded as many as 545 new grants. According to NIH, the number of new grants may increase with a return to 2003 levels after

declining in 2004. At the same time proposal success rates may drop as low as 27%, and the funding level of individual new and continuing grants may decrease to compensate for fewer available dollars.

### National Science Foundation (NSF)

Despite support in Congress for an effort to double the budget of the National Science Foundation between 2002 and 2007, funding for that agency declined 1.9% to \$5.5 billion. The budget will be \$5.47 billion after the 0.8% cut, which is \$105 million less than was appropriated in FY 2004. Within the NSF, the largest decrease was in Education and Human Resources, which fell from \$939 million to \$841 million, a decrease of 10.4%.

### Department of Veterans Affairs (VA)

The R&D budget for the VA declined 0.8% to \$813 million this year. Of that, \$405.6 million (\$402.35 million after the 0.8% cut) will go to medical and prosthetic research. This is a decrease of approximately \$0.4 million over 2004 funding.

### NASA

The NASA budget for Biological and Physical Research was allocated a total of \$1.048 billion (\$1.04 billion after the 0.8% cut), representing a 5.5% increase over 2004 levels. However, this figure is an estimate based on language in the appropriations bill and NASA has wide latitude in determining the spending allocation from the agency's overall appropriation of \$16.2 billion.

Most figures were taken from the AAAS analysis of the R&D funding in the FY 2005 appropriations bill, available at the URL <http://www.aaas.org/spp/rd/upd1104.htm>. ❖

these examples may seem far removed from the splashy discoveries frequently reported in the press, they effectively convey the lasting impact of basic scientific research. These concepts are central to our understanding of biology and they will continue to be the foundation upon which research continually builds.

**Arthur Guyton's** pioneering work in the field of cardiac physiology is reviewed in the essay by **John Hall** (<http://www.the-aps.org/publications/classics/hall.pdf>). Guyton's innovative experiments as described in his 1955 *American Journal of Physiology* paper have led to a new understanding of how the body regulates cardiac output. Guyton revolutionized his field with the use of quantitative techniques and some of the earliest available computer models, using them to show that peripheral circulation and venous return are critical in determining cardiac output. His forward-thinking approaches integrated the fields of physics, physiology, engineering and mathematics, thereby laying the groundwork for the developing field of biomedical engineering. This concept of integrating disciplines is now widely recognized as key to pushing the boundaries of science and developing solutions to complex problems.

Two exercise physiology papers by **Philip Gollnick** from the early 1970s are reviewed in the essay by **Christopher Ingalls** (<http://www.the-aps.org/publications/classics/ingalls.pdf>). Gollnick and his colleagues studied exercise-induced fiber type plasticity in human muscle, documenting the distribution of slow and fast twitch fibers in endurance-trained athletes. These early studies are part of a body of literature that has extensively explored the properties of muscle under different conditions. This work contributes not only to the understanding of a multitude of diseases that involve muscle, but also helps scientists and medical providers understand what happens to the muscles of people experiencing paralysis or long-term microgravity.

The work of **Hurley Motley** on pulmonary circulation is described in **Andrew Fishman's** essay (<http://www.the-aps.org/publications/classics/fishman.pdf>). Building on ear-

lier work done in animals, Motley and colleagues showed that blood vessels in the human lung respond to hypoxic conditions by undergoing vasoconstriction. The observation of this physiological phenomenon (hypoxic pulmonary vasoconstriction, or HPV) has been the basis for years of study that have established HPV as a major factor in certain types of heart and lung disease. Despite nearly six decades of research since this initial observation, the molecular mechanisms underlying HPV remain largely unknown and are still an active area of investigation. Understanding the mechanism of HPV will be critical in developing treatments for associated diseases.

### How to get the word out

Every day we have opportunities to tell our friends, family, and acquaintances about what we do and why it is important. It is also important to take advantage of opportunities to make presentations or participate in discussion groups at local science museums, schools, and health care institutions. Over the next few years, it will also be increasingly important to make the case for medical research to our elected officials. There is very little room for growth because of the deficit and competition from other programs, but research budgets may do marginally better if we explain why this is important.

Letters are one way to communicate with Congress. For guidelines on preparing letters, refer to the Legislative Action Center on the APS Public Affairs website ([http://www.the-aps.org/pa/action/communicating\\_congress.htm](http://www.the-aps.org/pa/action/communicating_congress.htm)). In addition, most Senators and Representatives have office hours or town meetings in their home districts where constituents can talk about their concerns.

With an annual investment in biomedical research at the NIH approaching \$28 billion dollars, scientists have to justify the need for continued growth in a time of tight budgets. Fostering a better understanding of science at all levels will help ensure continued support for government investment in research. ❖

## USDA Expected to Resume Web Posting of Animal Facility Reports

In January the Department of Justice (DOJ) issued a ruling that opens the way for USDA to resume posting reports of Animal Welfare Act (AWA) facility inspection reports on its website.

USDA first began posting such reports on October 1, 2001 as part of its compliance with the Electronic Freedom of Information Act (E-FOIA) Amendments. However, this practice was halted in 2002 in response to heightened security concerns as a result of the September 11, 2001 attacks and a growing appreciation for the threat posed by animal rights extremists. USDA halted E-FOIA posting of facility inspection reports and referred the matter to the DOJ for review.

On January 7 NABR issued an alert because DOJ had issued a ruling that opens the way for USDA posting of inspection reports to resume. The specifics of that ruling were not available at the time of this writing.

The AWA requires USDA to conduct an annual unannounced inspection of registered research facilities. Afterwards the USDA inspector issues a report indicating any violations of AWA regulations for veterinary care, animal husbandry, program oversight, or protocol review. This report is the document that USDA must provide when someone makes an FOIA request for a facility inspection report. It is also the document that will again be posted to the USDA website. The problem is that any infraction of the AWA regulations is considered a violation. If one does not understand the regulations, it may not be obvious which violations might endanger the life and health of animals and which ones involve record keeping or other administrative matters procedures that do not endanger animals. A second problem with these records is that the inspector may cite an institution for a violation because of a difference in professional judgment with institutional veterinarians or a difference of opinion on how to interpret what the AWA regulations require. The institu-

tion may be successful in appealing the violation, but the citation still remains a permanent part of the inspection report.

It has been shown that animal activists use the Internet to obtain information on institutions that use animals, and that extremists in the movement similarly use the Internet to identify potential targets. As a matter of prudence, NABR advises research institutions to request a copy of their inspection reports. This will enable them to know what information is being disclosed to the public. In addition, the New Jersey Association for Biomedical Research suggests that animal facility staff review the report carefully during their exit interviews with USDA inspectors to ensure its accuracy and to make sure that it does not contain identifying information about protocols, researchers, or staff members.

## Federal Agencies to Allow Multiple PIs on Research Grants and Contracts

In a memo released on January 11, 2005, Office of Science and Technology Policy (OSTP) Director John Marburger announced a revision of grant-making policy at federal agencies that will allow for two or more principal investigators (PIs) on research grants and contracts.

The action was the result of public comment gathered by the Research Business Models Subcommittee (RBM) of the National Science and Technology Council's (NSTC) Committee on Science (the NSTC is a cabinet level council through which the Executive Office of the President coordinates science and technology policies across the federal government). The RBM seeks to encourage collaborative research and streamline the management of federal grant awards. In recent years, there has been increased emphasis on developing interdisciplinary research to address complex scientific problems. This shift from the typical lab structure has necessitated other changes in

the field. The concern has been that without the usual measures of achievement present in single-investigator driven research, investigators participating in interdisciplinary projects could slow their career progress. These traditional measures include serving as the principal investigator on federal research grants and primary authorship on scientific papers. In fact, a recent study showed that scientists engaging in interdisciplinary projects were disproportionately graduate students, many of whom perceived their participation as being professionally risky in the long run (Rhoten and Parker 2004).

The expectation is that the new policy will acknowledge the contributions of PIs from multiple disciplines and provide formal recognition of shared project leadership. While this is a positive step at the federal level, it is also

important that individual institutions move toward this kind of recognition when awarding tenure and considering promotions. According to the RBM Project description, "universities depend significantly on federal data sources for information about their own faculty's participation in federally funded research," making this an important step in the process.

While the details of the policy and its implementation have yet to be finalized, a working group composed of representatives from the federal grant making agencies will soon meet to work out the details.

### Reference

1. **Rhoten, D. and Parker, A.** "Education. Risks and rewards of an interdisciplinary research path." *Science* **306**(5704): 2046, 2004. ❖

## Women in Pharmacology and Physiology Symposium "Managing a Laboratory"

IUPS 2005/Experimental Biology 2005  
Monday, April 4, 8:00-10:00 AM  
Marina D Room, San Diego Marriott Hotel

This symposium will address the various types of lab management skills that a physiologist will need to have to prosper in his/her career. These include:

- Mentoring vs. supervising
- How to delegate and still stay on top of things
- Conflict management or managing difficult employees
- Developing a budget

Presentations will be made by speakers, which will be followed by small group discussions of the following specific topics: interviewing tips, performance reviews, creating a healthy competitive environment, dealing with conflicts/romance in the lab, can a supervisor be a friend?, stimulating students, and small-group workshop on creating budgets. ❖



PHYSIOLOGY IN PERSPECTIVE:  
THE WALTER B. CANNON  
AWARD LECTURE (SUPPORTED  
BY THE GRASS FOUNDATION)

**Gerald DiBona**  
Univ. of Iowa

*"The Wisdom of the Body:  
Neural Control of the  
Kidney"*

SATURDAY, APRIL 2, 5:45 PM



HENRY PICKERING BOWDITCH  
AWARD LECTURE

**Ormond MacDougald**  
Univ. of Michigan

*"Role of Wnt Signaling in  
Development of Adipose  
Tissues and Bone"*

SUNDAY, APRIL 3, 5:45 PM



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

**Amira Klip**  
Hospital for Sick Children,  
Toronto, Ontario, Canada

*"Regulation of Glucose  
Transporters in Muscle  
Cells: Epurr si Muove"*

FRIDAY, APRIL 1, 10:30 AM



CARL W. GOTTSCHALK  
DISTINGUISHED LECTURESHIP  
OF THE RENAL SECTION

**Soren Nielsen**  
Univ. of Aarhus, Denmark

*"Aquaporin Water  
Channels in Kidney:  
Physiology and  
Pathophysiology"*

FRIDAY, APRIL 1, 2:00 PM



HORACE W. DAVENPORT  
DISTINGUISHED LECTURESHIP  
OF THE GASTROINTESTINAL  
SECTION

**Ann Hubbard**  
Johns Hopkins Univ., MD

*"The Ins and Outs of  
Membrane Traffic in  
Polarized Epithelial Cells"*

FRIDAY, APRIL 1, 3:15 PM

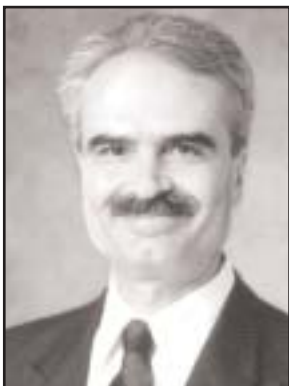


ERNEST H. STARLING  
DISTINGUISHED LECTURESHIP  
OF THE WATER AND  
ELECTROLYTE HOMEOSTASIS  
SECTION

**Giuseppe Bianchi**  
Univ. Vita Salute San  
Raffaele, Milan, Italy

*"The Genetic Control of  
Renal Na Handling in  
Primary Hypertension"*

SATURDAY, APRIL 2, 10:30 AM



ROBERT M. BERNE  
DISTINGUISHED LECTURESHIP  
OF THE CARDIOVASCULAR  
SECTION

**Roberto Bolli**  
Univ. of Louisville, KY

*"Preconditioning:  
A Paradigm Shift in the  
Biology of Myocardial  
Ischemia"*

SATURDAY, APRIL 2, 2:00 PM



CLAUDE BERNARD  
DISTINGUISHED LECTURESHIP  
OF THE TEACHING OF  
PHYSIOLOGY SECTION

**Ann Sefton**  
Univ. of Sydney, Australia

*"Charting a Global Future  
for Education in Physiology"*

SATURDAY, APRIL 2, 3:15 PM



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

**Julian Paton**  
Univ. of Bristol,  
United Kingdom

*"Genes and Proteins in the  
Blood Brain Barrier Affecting  
Arterial Pressure Regulation:  
Implications for the Etiology of  
Hypertension"*

SUNDAY, APRIL 3, 10:30 AM



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

**Erik A. Richter**  
Univ. of Copenhagen,  
Denmark

*"AMPK and Other Exercise-  
Induced Signaling in Skeletal  
Muscle: Relationship to  
Metabolism and Gene  
Expression"*

SUNDAY, APRIL 3, 2:00 PM



JOSEPH ERLANGER  
DISTINGUISHED LECTURESHIP  
OF THE CENTRAL NERVOUS  
SYSTEM SECTION

**Sten Grillner**  
Karolinska Institute,  
Stockholm, Sweden

*"The Selection and Intrinsic  
Function of Motor Programs:  
From Microcircuits to  
Integrative Function"*

SUNDAY, APRIL 3, 3:15 PM



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

**Gabriel Haddad**  
Albert Einstein College of  
Medicine, New York

*"Tolerance of Low O<sub>2</sub>:  
Lessons From Invertebrate  
Genetic Models"*

MONDAY, APRIL 4, 8:00 AM



AUGUST KROGH  
DISTINGUISHED LECTURESHIP  
OF THE COMPARATIVE  
PHYSIOLOGY SECTION

**Roy Weber**  
Univ. of Aarhus, Denmark

*"The Amazing World of  
(Hemo-)Globins: Models in  
Physiological Adaptation"*

MONDAY APRIL 4, 10:30 AM



HUGH DAVSON  
DISTINGUISHED LECTURESHIP  
OF THE CELL AND MOLECULAR  
PHYSIOLOGY SECTION

**Randy Schekman**  
Univ. of California, Berkeley

*"Mechanism and  
Regulation of Cargo Protein  
Sorting in the Secretory  
Pathway"*

MONDAY, APRIL 4, 2:00 PM



## Walter C. Randall Lecturer in Biomedical Ethics

Robert Williamson,  
Institut Pasteur

Tuesday, April 5, 2:00-3:00 PM

*"Ethics, the Human Genome and Physiology:  
Designer Babies and Human Clones"*



## Thursday March 31, 6:00 PM

### The Wallace O. Fenn Lecture

Speaker: Peter Agre, *Johns Hopkins University School of Medicine*  
Convention Center, Room 20D

**All session rooms are in the San Diego Convention Center.**

## Friday April 1, 2005

	8:00-10:00 AM	10:30 AM-12:30 PM	3:15-5:15 PM
CC 20D	Symp Lung TK: The Making of the Vertebrate Lung <b>Whitsett</b>	Symp: Signaling Pathways in Gut Mechano-sensitivity <b>Christofi and Schnemann</b>	
CC, 28E	FT: HIF-1 and Molecular Regulation of Oxygen Homeostasis <b>Semenza</b>	FT: Reactive Oxygen Species in the Vasculature <b>Wolin and Vanhoutte</b>	FT: Role of Reactive Oxygen & Nitrogen Species in Lung Injury and Diseases <b>Pitt and Mossman</b>
CC, 29C	FT: Genomics Tk Genetic Basis of Cardiopulmonary Disorders <b>Weiss</b>	Symp: Ecophys Tk: Cardio-Respiratory Physiology of Diving: Extreme Physiology at Depth <b>Butler</b>	Symp: Stem Cells in Developing and Adult Brain <b>Rakic</b>
CC, 29D	FT: Novel Molecular Mechanisms of Central Neuro-cardiovascular Control <b>Davisson and Schreihofner</b>	Symp: Regu Brain Tk: Molecules and Genes: Brainstem Development Underlying Breathing <b>Goulding</b>	FT: Reg Brain Tk The Phylogeny of Dual Respiratory Rhythm Generating Networks in Vertebrates <b>Milsom</b>
CC, 30A	8:00 AM-12:00 Noon: Education Refresher Course: Integrating Genomics into Physiology Courses: A New Paradigm or Just More Information? <b>Lemmons and Kwitek</b>		FT: Acid-Base Transporters <b>Romero</b>
CC, 30 B/C	Symp Cardiac Tk: Cardiac Electrophysiology & Arrhythmia Mechanisms <b>Noble</b>	Symp Cardiac Tk: Excitation-Contraction Coupling <b>Marks</b>	2:00-3:00 PM: MCS Landis Award Lecture <b>Huxley</b> MCS President's Symp: <b>Bohlen</b>
CC, 30 D/E	Symp: Feed/Fuel/Fat Tk: Molecular Bases of Energy Balance and Fuel Partitioning <b>Friedman</b>	Symp Thermoreg Tk: Life and Death: Metabolic Rate and Lifespan <b>Hammond</b>	Symp Thermoreg Tk: Scaling of Metabolic Rate with Body Size: How and Why? <b>Weibel and Hulbert</b>
CC, 31A	Symp Ecophys Tk: Functional Genomics of Macromolecular Damage Responses and Environmental Stress Adaptation <b>Somero</b>	FT: Tubular Control of the Renal Vasculature and Renin Secretion <b>Rosivall and Bell</b>	
CC, 31 B/C	Symp Epithelia Tk: Novel Mechanisms of Transporter Regulation <b>Bindels and Schulz</b>	Symp Epithelia Tk: Epithelial Polarity: Development to Disease <b>Fuller and Caplan</b>	Symp Renal BP Tk: Cell Biology of Sodium Transport in Kidney <b>Verrey and Hughey</b>
CC, 32	Symp Muscle Tk: Skeletal Muscle Plasticity <b>Holloszy</b>	10:30-11:30 AM Endo & Metab Section Lecture <b>Klip</b>	Symp Muscle Tk: Spring Molecules <b>Granzier</b>
CC, 33	Symp Vascular Tk: Angiogenesis <b>Weinstein</b>	Symp Vascular Tk: Central Role of Ion Channels in the Regulation of Vascular Tone <b>Nelson</b>	2:00-3:00 PM Renal Section Lecture <b>Nielsen</b> GI & Liver Section Lecture <b>Hubbard</b> 5:45-6:45 PM IUPS President's Lecture <b>Cowley</b>

## Saturday April 2, 2005

	8:00-10:00 AM	10:30 AM-12:30 PM	3:15-5:15 PM
CC 20D			Symp Lung Tk: Comparative Genomics of the Lung <b>Torday</b>
CC, 28E	FT: Endothelial Nitric Oxide and Cardiovascular Disease <b>Lefer and Loscalzo</b>	BMES Symp: Computational Biology of Cardiac Arrhythmias: From Ion Channel to Therapy <b>McCulloch and Giles</b>	FT: Locomotion Tk Locomotor Pattern Generators: Developmental, Molecular and Cellular Organization in Vertebrates <b>Grillner</b>
CC, 29C	FT: Vascular Tk New Aspects of Endothelial-Cell Matrix Interactions: The Glycocalyx <b>Lipowsky and Curry</b>	Education Symp: Effective Uses of information technologies in physiology education <b>Carlile</b>	FT: Regulation of Coronary and Skeletal Muscle Circulation <b>Spaan</b>
CC, 29D	FT: Reg Brain Tk Respiratory Long Term Facilitation: Mechanisms and Implications <b>Mitchell</b>	FT: Regu Brain Tk Molecules Underlying Diseases of the Central and Enteric Nervous Systems <b>Richerson</b>	Symp: Muscle Tk Stem Cells of Cardiac and Skeletal Muscle <b>Schneider</b>
CC, 30A	FT: Feed/Fuel/Fat Tk Molecular Mechanisms of Fuel Sensing <b>L. Rossetti and D.G. Hardie</b>	FT: Feed/Fuel/Fat Tk Adipose Tissue: Fat Depot, Fuel, Stat, and Endocrine Organ <b>Fried</b>	Symp Thermoreg Tk: Gene Regulation for Survival at Low Temperatures <b>Fields</b>
CC, 30 B/C	Symp Renal BP Tk: Renal NaCl Reabsorption: Insights into Human Blood Pressure Control <b>Welling</b>	Symp: Cellular and Molecular mechanisms of synaptic plasticity <b>Nicoll</b>	2:00-3:00 PM IUPS Ernst Knobil Lecture <b>Gustaffson</b> Symp: Nuclear Receptor Co-regulators <b>Schuele</b>
CC, 30 D/E	Symp Genomics Tk: Genomics of Transport and Sensory Functions <b>Strange</b>	Symp Vascular Tk: Emerging Modes of Ca <sup>2+</sup> Signaling in the Regulation of Smooth Muscle Contractile Proteins <b>Somlyo</b>	Symp Genomics Tk: Discovery of Genes for Polycystic Kidney Disease <b>Harris</b>
CC, 31A	FT: Impact of Gravity on Physiological Systems <b>Phillips</b>	FT: Transport: PKD, Cilium <b>Somlo</b>	FT: Urea Transporters in the Post Genomic Era <b>Smith and Sands</b>
CC, 31 B/C	Symp Epithelia Tk: Epithelial Cells & their Neighbors <b>Carey and Raybould</b>	Symp: Sex and Gender Differences in Pain and Analgesia <b>Berkley</b>	AFMR Symp: Molecular Mechanisms Linking Sodium to Hypertension <b>Blaustein and Hamilton</b>
CC, 32	Symp Muscle Tk: Force Generation <b>Spudich</b>	Symp: Mech/Chemo Tk Structure-Function of Mechanogated Ion Channels <b>Sokabe and Sachs</b>	FT: Calcium Tk Techniques <b>Meyer</b>
CC, 33	Symp: Oxygen Sensing and Hypoxia: Development, Adaptation and Disease <b>Prabhakar</b>	Water & Electrolyte Homeostasis Dist Lect <b>Bianchi</b>	2:00-3:00 PM Dist Lect of CV Section <b>Bolli</b> 3:15-4:15 PM Dist Lect of Teaching Section <b>Sefton</b> 5:45-6:45 PM Cannon Lecture <b>DiBona</b>

## Sunday April 3, 2005

8:00-10:00 AM

10:30 AM-12:30 PM

3:15-5:15 PM

CC 20D

Symp Ecophys Tk: Rescue Mechanisms from Hypoxia  
**Lutz**

CC, 28E	AFMR Symp: Lipid Rafts—Floating from Bench to Bedside <b>Goebel</b>	Symp: Phylogeny and Ontogeny of the Renin-Angiotensin System <b>Nishimura and Gross</b>	FT: Gut Interactions with Pancreas and Liver <b>Brubaker</b>
CC, 29C	FT Mech/Chemo Tk: Regulatory Mechanisms of Mechanosensory Cells <b>Kaneko</b>	FT Epithelia Tk: The Molecular Basis of Epithelial Disease <b>Sheppard</b>	Symp: Transnational Impacts of Animal Welfare Regulations <b>Kregel and Persson</b>
CC, 29D	FT Cardiac Tk: Cardiac Metabolism and Energetics <b>Ingwall</b>	FT Cardiac Tk: Cardiac Mechanics <b>McCulloch</b>	FT Thermoreg Tk: Pyrogen-Sensing and Suppressing Pathways Mediating the Febrile Response <b>Blatteis</b>
CC, 30A	FT: Education The Role of Student Practical Laboratories in Physiology Education <b>Silverthorn and Alves da Rocha</b>	FT: Lung Tk Pro-inflammatory Signaling in Lung Endothelial Cells <b>Bhattacharya</b>	FT Lung Tk: Receptors & Signaling Pathways in Lung Injury and Repair <b>Broadus</b>
CC, 30 B/C	FT: Epithelial Ion Channels <b>Blazer-Yost</b>	FT: Mechanisms of Metabolic Depression: Comparative Aspects <b>Heldmaier</b>	5:45-7:45 PM Careers Symposium: International Collaboration: Science Knows no Boundaries <b>Dwinell and Andrade</b>
CC, 30 D/E	Symp: New Advances in Understanding Control of the Cerebral Circulation <b>Heistad and Harder</b>	Symp: Calcium Channels, Tyrosine Kinases and Smooth Muscle Function <b>Akbarali and Davis</b>	Symp Vascular Tk: Stem Cells and the modification of vascular functions <b>March</b>
CC, 31A	FT: Amino Acid Transporters <b>Kanai</b>	Symp: Renal BP Tk Gender Effects on Arterial Pressure Regulation <b>Baylis</b>	Renal BP Tk FT: Genetic Models of Hypertension <b>Sigmund</b>
CC, 31 B/C	Symp Renal BP Tk: Comparative Genomics of Blood Pressure Control: Genetic Maps in Humans, Rats, and Mice <b>Corvol and Kwitek</b>	Symp: Gravity and Evolution: From Cells to Snakes <b>Hargens and Norsk</b>	FT Genomics Tk: Complex Pathways of Function and Disease Deduced from the Whole Genome Perspective <b>Frazier</b>
CC, 32	Symp Calcium Tk: Proteins <b>Spät</b>		Symp Calcium Tk: Molecular Basis of Disease <b>Hidalgo</b>
CC, 33	Symp Feed/Fuel/Fat Tk: Neural Control of Energy Balance <b>Seeley</b>	Lect of Neural Control & Autonomic Reg Section <b>Paton</b>	2:00-3:00 PM Lect of the Environ & Exercise Physiol Section <b>Richter</b> 3:15-4:15 PM Lect of the CNS Section <b>Grillner</b> 5:45-6:45 PM Henry Pickering Bowditch Award Lecture <b>MacDougald</b>

## Monday April 4, 2005

	8:00-10:00 AM	10:30 AM-12:30 PM	3:15-5:15 PM
CC 20D		Krogh Dist Lect of Comparative and Evolutionary Physiology Section and Scand. Phys. Society <b>Weber</b>	
CC, 28E	Comroe Lect of Respiration Section <b>Haddad</b>	FT: Sex/Gender, Hormones and Cardiovascular Function <b>Duckles and Schini-Kerth</b>	Symp Locomotion Tk: Modulation of the Locomotor Pattern Generators by Neurotransmitters & by Sensory Afferents <b>Pearson</b>
CC, 29C	FT Vascular Tk: Atherosclerosis: The New Inflammatory Disease <b>Owens</b>	Calcium Tk Controversy The Mechanism of Action of the Ca <sup>2+</sup> Releasing Messenger NAADPL. <b>Santella</b>	Communications Symp: Developing and Implementing a Communications Strategy: The Basics for the Basic Scientist <b>Carey</b>
CC, 29D	FT: Mosso and Muscular Fatigue: 116 Years after the First Congress of Physiologists <b>Tipton and Nosek</b>		FT Muscle Tk: Muscle as an Endocrine Organ <b>Terjung</b>
CC, 30A	Education FT: The Many Faces of Problem-Based Learning: A Framework for Integrative Physiology Education <b>Hansen</b>	FT: Sensing Cardiovascular Homeostasis: Novel Molecules as Mechano- and Chemosensors <b>Wang and Gill</b>	FT: Current Ideas in Pulmonary Ventilation and Blood Flow <b>Olfert and Prisk</b>
CC, 30 B/C	FT Cardiac Tk: Cardiac Remodeling <b>Seidman</b>	FT: Development of Ventilatory Control <b>Fregosi</b>	SEBM Symp: Physiological Proteomics <b>Blake and Goodman</b>
CC, 30 D/E	Symp Feed/Fuel/Fat Tk: Genetic Determinants of Obesity and Metabolic Disease <b>Bouchard</b>	Symp Feed/Fuel/Fat Tk: Body Weight Regulation throughout the Life Cycle <b>McMillen</b>	Feed/Fuel/Fat Tk Metabolic Syndrome: From Clinical Insights to New Therapies <b>Schnackenberg and Montrose-Rafizadeh</b>
CC, 31A	AFMR Symp: Diagnosis and Treatment Utilizing Natriuretic Peptides <b>Vesely</b>	Renal BP Tk Controversy Role of Kidney vs Brain in Blood Pressure Control and Hypertension <b>Fink and Lohmeier</b>	Renal BP Tk FT: IUPS Grand Rounds on Hypertension <b>Hall</b>
CC, 31 B/C	Symp Epithelia Tk: PDZ Domain Scaffolding Proteins and their Functions in Polarized Cells <b>Donowitz and Kurachi</b>	Symp Reg Brain Tk: Neural Control of the Circulation in Health and Disease <b>Guyenet</b>	AFMR Symp: Atherosclerosis: Immune and Inflammatory Aspects <b>Reiss</b>
CC, 32	Symp Calcium Tk: Integrative Aspects: Ca <sup>2+</sup> Signaling in the Nervous System <b>Vekhratsky</b>	Symp: Phospholipid Oxidative Signaling in Regulation of Apoptosis & Phagocytosis <b>Kagan</b>	2:00-3:00 PM Dist Lect of the Cell & Molec Phys Section <b>Schnekman</b> Ecophys Tk Symp: Biologging: Monitoring the Ecophysiology of Animals in the Marine Environment <b>Block</b>
CC, 33	FT Muscle Tk: Muscle Dystrophies of the Dystrophin Complex <b>Sweeney</b>	Genomics Tk Tutorial/Workshop Computational & Bioinformatic Applications to Systems Biology <b>Beard</b>	Symp Genomics Tk: Imprinting, Development and the Programming of Adult Health <b>Thornburg</b>

## Tuesday April 5, 2005

	8:00-10:00 AM	10:30 AM-12:30 PM	3:15-5:15 PM
CC, 28E	Symp Locomotion Tk: Initiation and Adaptation of the Locomotor Pattern <b>Deliagina</b>	FT Locomotion Tk: Long Term Plasticity & Spinal Cord Injury <b>Rossignol</b>	
CC, 29C	FT: Mechanical Ventilation and Lung Injury <b>Quinn</b>	FT Calcium Tk: Overview: From Organelles to Organ <b>Schulz</b>	FT Epithelia Tk: Epithelial Genomics, Proteomics and Genetic Models <b>Knepper and Melvin</b>
CC, 29D	Symp Cardiac Tk: Regenerative Capacity of the Heart <b>Rosenthal</b>	Muscle Tk Debate: Intracellular Energy Fluxes: Dual Roles for Equilibria and Compartmentation <b>Kushmerick</b>	
CC, 30A	FT: Mitochondrion-centered Preconditioning in Heart, Brain and Vasculature <b>Busija</b>	FT: The Nature of Intestinal Adaptations: Cellular Diversity & Versatility <b>Ferraris</b>	Education Symp: Research in Physiology Education from the Classroom to the Teaching Community <b>Modell</b>
CC, 30 B/C	9:00-10:00 AM Lecture Robert Pitts Lecture <b>Schnermann</b>	ALACF Symp: Neural Regulation of Hydroelectrolytic Homeostasis <b>Rodrigues and Alves da Rocha</b>	Symp: TRP Channels: Physiological Genomics and Proteomics <b>Sage and Nilius</b>
CC, 30 D/E	Symp Thermoreg Tk: Integrative Neuronal Mechanisms for Thermoregulation <b>Kanosue and Gerstberger</b>	Symp Lung Tk: Cellular and Molecular Aspects of Lung Parenchymal and Airway Remodeling <b>Tuder</b>	Symp Lung Tk: Genetic & Developmental Insights into Pulmonary Vascular Pathobiology <b>Rabinovitch</b>
CC, 31A	FT: Role of the Choroid Plexus <b>Brown and Gherzi-Egea</b>	Symp Genomics Tk: Genomics of Circadian Clocks <b>Foster</b>	FT Ecophys Tk: Molecular Physiology of Diving <b>Williams</b>
CC, 31 B/C	Symp: Old Receptors, New Functions <b>Samarut</b>	Symp: Inflammatory Aspects of Hypertension: Insights from the Microcirculation <b>Schmid-Schonbein</b>	2:00-3:00 PM Walter C. Randall Lecture on Ethics in Physiology <b>Williamson</b> IUPS Ethics Workshop. Panel Discussion on Ethics & Physiology in the Era of the Human Genome <b>Weibel</b>
CC, 32			Symp Mech/Chemo Tk: Molecular Mechanisms of Thermosensation <b>Patapoutian</b>
CC, 33	Symp Vascular Tk: Coordinating Interactions between Endothelium and Smooth Muscle <b>Busse</b>	Symp: How do Emotions & Motivations Interact with Autonomic Functions? <b>Buijs</b>	Symp Vascular Tk: Vascular Inflammation—The role inflammatory cell extravasation in tissue inflammation and injury <b>Linden</b>

## Sections Special Functions

### Cardiovascular

**Steering Committee**  
Monday, April 4, 12:00 PM  
Marriott, Irvine

**Banquet**  
Monday, April 4, 7:00 PM  
Location: offsite, TBD

**Industry-Foundations Liaison Committee**  
Monday, April 4, 12:00 pm  
Marriott, Boardroom

### Cell and Molecular Physiology Section Steering Committee

Friday, April 1, 12:00 PM  
Marriott, Irvine

**Banquet**  
Monday, April 4, 6:30 pm  
Location: offsite, TBD  
Advanced-purchased tickets required. For more information, contact Eric Delpire, Vice Chair of the Cell and Molecular Physiology Section, Tel: 615-343-7409; Fax: 615-343-3916; Email: eric.delpire@vanderbilt.edu

### Central Nervous System Program Committee

Thursday, March 31, 12:00 PM  
Marriott, Los Angeles

**Steering Committee**  
Monday, April 4, 12:00 PM  
Marriott, Torrance

**Reception**  
Sunday, April 3, 5:30 PM  
Marriott, Torrance

### Comparative and Evolutionary Physiology

**Steering Committee**  
Friday, April 1, 1:00 PM  
Marriott, Rancho Las Palmas

**Business Meeting and Social**  
Monday, April 4, 12:00 PM  
Marriott, Mission Hills

### Endocrinology and Metabolism Steering Committee

Saturday, April 2, 12:00 PM  
Marriott, Rancho Las Palmas

### Business Meeting and Awards Reception

Sunday, April 3, 6:00 PM  
Marriott, Boardroom

### Environmental and Exercise Physiology

**Section Program Committee**  
Thursday, March 31, 5:30 PM  
Marriott, Newport Beach

**Steering Committee**  
Saturday, April 2, 7:00 AM  
Marriott, Torrance

**Student Luncheon**  
Sunday, April 3, 12:15 PM  
Marriott, Mission Hills

**Business Meeting and Banquet**  
Sunday, April 3, 6:00 PM  
Marriott, San Diego A

### Epithelial Transport Group Steering Committee

Friday, April 1, 12:00 PM  
Marriott, Boardroom

### Gastrointestinal & Liver Program Committee

Friday, April 1, 7:00 AM  
Marriott, Rancho Las Palmas

**Steering Committee**  
Saturday, April 2, 12:00 PM  
Marriott, Balboa

**Reception and Business Meeting**  
Sunday, April 3, 5:30 PM  
Marriott, Balboa

### History of Physiology Group Business Meeting

Sunday, April 3, 12:00 PM  
Marriott, Torrance

### Neural Control and Autonomic Regulation

**Section Steering Committee**  
Friday, April 1, 12:30 PM  
Marriott, Mission Hills

**Distinguished Lecturer Reception**  
Sunday, April 3, 6:30 PM  
Marriott, Coronado

### Renal

**Section Steering Committee**  
Saturday, April 2, 12:00 PM  
Marriott, Los Angeles

**Reception**  
Saturday, April 2, 5:30 PM  
Marriott, Newport Beach

### Astra Zeneca Young Investigator Award

Friday, April 1, 6:30 PM  
Marriott, Marina F

**Banquet**  
Monday, April 4, 6:30 PM

US Grant Hotel  
326 Broadway, San Diego, CA  
For more information, contact:  
Jeffrey L. Garvin, Treasurer, Renal  
Section, Tel: 313-916-2048; Fax: 313-  
916-1479; email: jgarvinl@hfhs.org

### Respiration

**Section Program Committee**  
Sunday, April 3, 7:00 AM  
Marriott, Mission Hills

**Steering Committee**  
Monday, April 4, 12 PM  
Marriott, Los Angeles

**Business Meeting**  
Monday, April 4, 7:00 AM  
Marriott, Newport Beach

**Banquet**  
No Information Provided by Section

### Teaching of Physiology Steering Committee

Friday, April 1, 12:00 PM  
Marriott, Torrance

**Distinguished Lecturer Reception**  
Saturday, April 2, 4:15 PM  
Marriott, Balboa

**Business Meeting**  
Sunday, April 3, 5:30 PM  
Marriott, Newport Beach

**Banquet**  
Sunday, April 3, 7:00 PM  
Location: offsite, TBD

**Steering Committee-Satellite  
Meeting Workshop**  
Wednesday, April 6, 9 AM  
Marriott, Rancho Las Palmas

### Water and Electrolyte Homeostasis

**Joint Steering/Awards/Section  
Program Committees**

Saturday, April 2, 12:00 PM  
Marriott, Irvine

**Luncheon and Business Meeting**  
Sunday, April 3, 12:00 PM  
Location: TBD

Advanced-purchased tickets required. For more information, contact Jane F. Reckelhoff, Secretary/Treasurer of the Water and Electrolyte Homeostasis Section, Tel: 601-984-1819; Fax: 601-984-1817; email: jreckelhoff@physiology.umsmed.edu

## Committee Meetings

### Animal Care and Experimentation

Sunday, April 3, 7:00 AM  
Marriott, Irvine

### Career Opportunities in Physiology

Monday, April 4, 7:00 AM  
Marriott, Torrance

### Committee on Committees

Friday, April 1, 8:00 AM  
Marriott, Torrance

### Communications Committee

Tuesday, April 5, 12:00 PM  
Marriott, Torrance

### Education

Sunday, April 3, 7:00 AM  
Marriott, Newport Beach

### International Physiology

Saturday, April 2, 12:00 PM  
Marriott, Newport Beach

### Joint Program

Thursday, March 31, 1:00 PM  
Marriott San Diego C

### Industry Members Mixer

Sunday, April 3, 5:30 PM  
Marriott, Rancho Las Palmas

### Liaison with Industry

Sunday, April 3, 12:00 PM  
Marriott, Los Angeles

### Long-Range Planning

Saturday, April 2, 12:00 PM  
Marriott, Torrance

### Membership

Saturday, April 2, 7:00 AM  
Marriott, Rancho Las Palmas

### Perkins Memorial Fellowship

Friday, April 1, 12:00 PM  
Marriott, Los Angeles

### Porter Physiology Development

Saturday, April 2, 12:00 PM  
Marriott, Boardroom

### Public Affairs

Saturday, April 2, 7:00 AM  
Marriott, Newport Beach

### Section Advisory

Thursday, March 31, 3:00 PM  
Marriott, Rancho Las Palmas

### Trainee Advisory Committee

Saturday, April 2, 7:00 AM  
Marriott, Los Angeles

### Women in Physiology

Tuesday, April 5, 7:00 AM  
Marriott, Torrance

## Publications Special Functions

### Journal Editorial Boards Group Meeting

Thursday, March 31, 3:00 PM  
Marriott, Point Loma

### *Advances in Physiology Education*

Editor and Associate Editors  
Tuesday, April 5, 7:00 AM  
Marriott, Newport Beach

### *AJP: Cell Physiology*

Editor and Associate Editors  
Sunday, April 3, 12:00 PM  
Marriott, Rancho Las Palmas

### *AJP: Endocrinology and Metabolism*

Editor and Associate Editors  
Sunday, April 3, 12:00 PM  
Marriott, Boardroom

### *AJP: Gastrointestinal and Liver Physiology*

Editor and Associate Editors  
Sunday, April 3, 12:00 PM  
Marriott, Irvine

### *AJP: Heart and Circulatory Physiology*

Editor and Associate Editors  
Sunday, April 3, 7:00 AM  
Marriott, Boardroom

### *AJP: Lung Cellular and Molecular Physiology*

Editor and Associate Editors  
Monday, April 4, 7:00 AM  
Marriott, Boardroom

### *AJP: Renal Physiology*

Editor and Associate Editors  
Monday, April 4, 12:00 PM  
Marriott, Balboa

### *AJP: Regulatory, Integrative and Comparative Physiology*

Editor and Associate Editors  
Monday, April 4, 12:00 PM  
Marriott, Rancho Las Palmas

### *Journal of Applied Physiology*

Editor and Associate Editors  
Sunday, April 3, 12:00 PM  
Marriott, Balboa

### *Journal of Neurophysiology*

No meeting scheduled

### *Physiology*

Editor and Associate Editors  
Monday, April 4, 7:00 AM  
Marriott, Balboa

### *Physiological Genomics*

No meeting scheduled

### *Physiological Reviews*

Editor and Associate Editors  
Friday, April 1, 12:00 PM  
Marriott, Newport Beach

### Book Advisory Committee

Monday, April 4, 12:00 PM  
Marriott, Newport Beach

### History of Physiology Book Committee

Sunday, April 3, 12:00 PM  
Marriott, Newport Beach

# You're invited...

Come and see the research that *tomorrow's* graduate students are doing *today!*

## NEW APS Undergraduate Research Poster Session and David S. Bruce Award Reception

*San Diego Convention Center, Area outside Ballroom 20*  
*Saturday, April 2, 2005*  
*4:30-6:00 P.M.*

★ Meet the finalists for the David S. Bruce Awards for Excellence in Undergraduate Research and congratulate the awardees

★ Meet your future graduate students and be amazed at the research they are doing as undergraduates. All first-author physiology undergraduates who are presenting a poster will be invited to present their poster at this special session.

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If you have an undergraduate student who is 1st-author on a poster and they have not received an invitation to present their poster at this special APS session, please fill out the form below and fax it in to the APS Education Office or email us at [education@the-aps.org](mailto:education@the-aps.org).

Yes, I would like to present my poster at the APS Undergraduate Research Poster Session.

Abstract #: \_\_\_\_\_

Name: \_\_\_\_\_

Contact information: \_\_\_\_\_

\_\_\_\_\_

Email: \_\_\_\_\_

Research Host's Name: \_\_\_\_\_

Research Host's Email: \_\_\_\_\_

Signature: \_\_\_\_\_

(sponsored by the APS Education Committee)



## Mind Time: The Temporal Factor in Consciousness

Benjamin Libet.  
Cambridge, MA: Harvard University Press, 248 pp., illus., index, \$29.95.  
ISBN: 0-674-01320-4.

The main purpose of this book is ostensibly to summarize and present essential elements of the relationships between the timing of objective neurophysiologic events and the appearance of conscious awareness of sensory inputs and voluntary acts, a subject that Dr. Benjamin Libet has been intensively and productively investigating in human subjects for many years. This in itself would be sufficient to justify the reading of this book, but an added bonus is the fascinating and scholarly way that Libet has extended the significance of his experimental findings to the more esoteric concepts of the conscious and unconscious minds, voluntary behavior, free will, and even the soul.

Consciousness is a property of living things and has, therefore, understandably been a subject of interest to biological scientists for centuries. Because conscious awareness of oneself and one's environment is so abstract a phenomenon, so unique to each individual, and so far beyond our current knowledge and concepts of energy and matter, that it has also attracted the interest and speculation of those concerned with matters outside the boundaries of the physical world, such as philosophers, theologians, and even spiritualists. It has often been lumped together with comparably abstract, non-physical phenomena, such as reasoning and faith, into the domains of the mind and soul, which have not always been considered to be associated with the brain. For example, the mind and soul were once thought to reside in the Bone of Luz, a mythical bone believed by Mohammed and the Arabs to be located at the base of the spine, probably the coccyx, and by the Hebrews of the cabala at the top of the spine. More recently, psychoanalytical theory and practice found no need to relate mental processes to brain functions and mechanisms. A propos of this, the emi-

nent psychiatrist Leon Eisenberg of Harvard University presented an insightful lecture to the Royal Society of Psychiatry (published in the *British Journal of Psychiatry*, 148:497-508, 1986) on "Mindlessness and Brainlessness in Psychiatry," in which he compared the irrelevancy of the brain in psychoanalysis, e.g., "brainlessness," with the disregard of the mind in recent obsessions with neurotransmitters and their receptors in the brain, e.g., "mindlessness."

It is, therefore, not surprising that there have been at least two schools of thought about the relationship between brain and mental functions. One school is deterministic or reductionist and believes that mental functions are products of brain functions. It preaches that products of the mind, such as thought, awareness of oneself and surroundings, feelings of love, hate, fear, loyalty, faith, etc., all phenomena currently beyond the known physical and chemical processes within the brain, will, when we learn more about the brain, ultimately prove amenable to scientific experimentation, observation, and explanation. In contrast, the other school, Cartesian dualism, preaches that brain and mind are completely unrelated and belong to different and separate domains, one physical and open to experimental investigation, and the other philosophical, and that matters of the mind, like the soul, are beyond the realm of direct observation of physical and chemical processes. In what other realm they might exist is unclear. Is it a spiritual one? In any case, uncertainties about the nature of consciousness may have intrigued biologists but has generally inhibited them from studying it experimentally and trying to define it in terms of known biological processes. For example, several years ago I was asked to participate in a symposium on consciousness by presenting a talk on the Biochemistry of Consciousness. I was initially at a loss about what to say, but, fortunately, recalled Justice Potter Stewart's statement in the Supreme Court's decision in 1973 about obscenity. I opened my talk by paraphrasing his statement by replacing the word "obscenity," with "consciousness;" "I shall not today attempt

further to define consciousness, and, perhaps, I could never succeed in intelligibly doing so, but I know it when I see it." I then proceeded to discuss the biochemistry of unconsciousness, a condition readily associated with and described in terms of disturbances in biochemical and physiological processes in the body and brain.

In this book Libet's deft interweaving of his own beliefs and research findings with views held by scientists and philosophers over the centuries makes for fascinating reading. The question of the nature of consciousness has seduced many brilliant thinkers, including Descartes, Newton, Pascal, and more recently some Nobel laureates in the biological sciences, such as August Krogh, John Eccles, and Francis Crick. Although never Libet never expresses unambiguously a commitment to either Cartesian dualism or determinism, he is clearly not intimidated by the vague and esoteric nature of consciousness and does tend to support the belief that brain functions and conscious subjective awareness are intertwined. It is, I believe, difficult not to believe this. Although biochemical and electrical processes can persist and memories retained during prolonged absences of consciousness, as, for example, in general anesthesia or coma, there is no evidence of conscious subjective awareness in the absence of cerebral energy metabolism or electroencephalographic activities. The major message of this book is that it is possible to study and characterize some properties of consciousness by studies in the brain with conventional physiological techniques.

Studies of consciousness require intelligible communication between a conscious subject and the investigator. This requirement essentially limits such studies to human subjects in an unanesthetized conscious state. Libet summarizes in this book the results of such truly unique studies that he initiated in collaboration with the neurosurgeon Bertram Feinstein a number of years ago and has continued since then. These were done by stimulating and/or recording electrical activity in defined regions of the cerebral cortex of patients in the conscious state during neurosurgical procedures and cor-

relating the electrical responses in the cortex with the patients' reports of their first conscious subjective awareness of the event. The results showed surprising discrepancies in the timing of the electrical responses in the brain and the onset of conscious awareness during induced sensory stimulation or conscious voluntary movements. This explains the inclusion of time in the title of the book. Conscious awareness of sensory stimulation lags about 500 milliseconds behind the cortical electrical response, and voluntary movements freely initiated and executed by the subjects were associated with electrical signals in the cortex that preceded conscious awareness of the movement or the intent to execute the movement by 150-350 milliseconds. The delays may possibly be reflecting the additional time needed to process the information contained in the unconscious electrical signals, but in any case, there are unconscious processes going on in the brain before there is conscious recognition of a sensation or a voluntarily initiated muscular activity. If even during a willed motor task unconscious activities precede the conscious awareness of the task, what does this mean with respect to free will? On the basis of

these observations Libet considers the possible operation of an unconscious mind that precedes and underlies those of the conscious mind and engages in fascinating considerations of the existence and role of free will. If unconscious processes manifested by the electrical activities in the cerebral cortex precede the performance and the awareness of a voluntarily executed motor movement, is this evidence that the action is actually initiated by unconscious mechanisms and that the conscious awareness is only of the execution of an act initiated and executed unconsciously without control by free will? This raises again the age-old question of whether free will actually exists. Libet believes that it does. He raises the ingenious and provocative hypothesis that there is in the time lags between the onset of the unconscious cortical electrical activity, the conscious awareness of the intent to act, and the execution of the voluntary movement, adequate time for free will to intervene to restrain the completion of the act. In other words, free operates not to initiate but to interrupt and prevent the completion of an action already initiated and underway unconsciously. From thereon we are treated to fascinating extrapolations

of these findings to the philosophical and possibly mystical concepts of mind and soul. Included is a clever, imaginary dialogue between the author and René Descartes, the reputed father of the school of dualism between mind and brain, regarding the meaning and significance of the author's experimental findings.

In this book Libet does not even come close to explaining the fundamental nature of consciousness and mind, and he does not claim to do so. What he does do, however, is to demonstrate conclusively that it is possible to study these non-physical entities with the tools of physiology and to obtain information that characterize in physical terms some of the properties of these esoteric phenomena. Moreover, he presents his case in a very readable and scholarly way, which make this book a pleasure to read. It is a stimulating interplay between philosophy and science about a subject of immense interest. ❖

Louis Sokoloff  
National Institutes of Health,  
Bethesda, MD

## Books Received

### *Genomics and Proteomics in Nutrition.*

Carolyn D. Berdanier and Naima Moustaid-Moussa, (Editors).  
New York: Marcel Dekker, Inc., 2004,  
507 pp., illus., index, \$179.95.  
ISBN: 0-8247-5430-1.

### *Handbook of Stress Medicine and Health, Second Edition.*

Cary L. Cooper, (Editor).  
Boca Raton, FL: CRC Press I LLC,  
2005, 410 pp., illus., index, \$149.95.  
ISBN: 0-8493-1820-3.

### *Molecular and Cellular Exercise Physiology.*

Frank C. Mooren and Klaus Volker,  
(Editors).  
Champaign, IL: Human Kinetics,  
2005, 455 pp., illus., index, \$89.00.  
ISBN: 0-7360-4518-X.

### *Principles of Exercise Testing and Interpretation, Including Pathophysiology and Clinical Applications. Fourth Edition.*

Karlman Wasserman, James E. Hansen, Darryl Y. Sue, William W. Stringer, Brian J. Whipp.  
Philadelphia, PA: Lippincott Williams & Wilkins, 2005, 585 pp., illus, index, \$89.95.  
ISBN: 0-7817-4876-3.

### *The Scientific Basis of Integrative Medicine.*

Leonard A. Wisneski and Lucy Anderson.  
Boca Raton, FL: CRC Press I LLC,  
2005, 279 pp., illus., index, \$89.95.  
ISBN: 0-8493-2081-X.

## Schultz Awarded Distinguished Professorship

**Stanley Schultz**, past president of the APS, has been awarded the H. Wayne Hightower Distinguished Professorship in the Medical Sciences of the University of Texas Medical School at Houston. He is Dean of that school and also holds the Fondren Family Chair in Cellular Signaling. ❖

**Christopher Bell**, Assistant Professor, is currently with the Department of Health and Exercise Science, Colorado State University, Fort Collins, CO. Bell formerly had been with the Department of Integrative Physiology, University of Colorado at Boulder, Boulder, CO.

**Mohammed Jasim Uddin Chowdhury** recently joined the US Environmental Protection Agency, Mid-Continent Ecology Division, Duluth, MN. Chowdhury was formerly affiliated with the Department of Biology, McMaster University, Hamilton, Ontario, Canada.

**Roger Fielding** is currently associated with Tufts University as Director and Scientist, USDA JM Human Nutrition Research Center on Aging, Tufts University, Boston, MA. Fielding was previously affiliated with the Department of Health Sciences, Boston University, Boston, MA.

**Akio Inui** has accepted the position of Professor, Kagoshima University Graduate School of Medicine and Dental Science, Department of Social and Behavioral Medicine, Kagoshima, Japan. Inui formerly was affiliated with the Division of Diabetes, Digestive, and Kidney Diseases, Kobe University School of Medicine, Hyogo, Japan.

**Timothy A. Jones** has accepted a position with the Department of Communication Sciences and Disorders, School of Allied Health Sciences, East Carolina University, Greenville, NC. Jones formerly was associated with the Department of Surgery and Physiology, University of Missouri-Columbia School of Medicine, Columbia, MO.

**Kichang Lee** has joined the Massachusetts Institute of Technology, Cambridge, MA, as a Research Scientist. Lee was previously affiliated with the Department of Neurology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA.

**Robin Looft-Wilson** has affiliated with the Kinesiology Department, College of William & Mary, Williamsburg, VA. Looft-Wilson had been associated with the John B. Pierce Foundation Lab, Yale University, New Haven, CT.

**Richard McAllister** has moved to the Department of Biomedical Sciences, University of Missouri, Columbia, MO. McAllister was formerly a member of the Department of Anatomy and Physiology, Kansas State University, Manhattan, KS.

**Jeffrey Potts** has joined the Dalton Cardiovascular Research Center, University of Missouri, Columbia, MO, as Associate Professor. Potts was previously affiliated with the Department of Physiology, Wayne State University School of Medicine, Detroit, MI.

**Harry B. Rossiter** moved to the School of Sport and Exercise Sciences, University of Leeds, Leeds, United Kingdom. Formerly, Rossiter was associated with the Department of Medicine, Division of Physiology, University of California, San Diego, CA.

**Nancy Rusch** is currently Professor and Chair, Department of Pharmacology & Toxicology, University of Arkansas for Medical Sciences, Little Rock, AR. Rusch was previously affiliated with the Department of Pharmacology, Medical College of Wisconsin, Milwaukee, WI.

**Narine Sarvazyan** has affiliated with the Department of Pharmacology & Physiology, George Washington University, Washington, DC. Formerly, Sarvazyan had been associated with the Department of Physiology, Texas Tech University Health Science Center, Lubbock, TX.

**Jeffrey R. Scott** has joined the Immunobiology Research Center,

BIDMC, Harvard Medical School, Boston, MA. Scott had previously been associated with the Department of Medical Biophysics, University of Western Ontario, London, Ontario, Canada.

**Hirofumi Tanaka** has moved to the Department of Kinesiology, University of Wisconsin, Madison, WI. Tanaka had been previously associated with the Department of Kinesiology and Health Education, University of Texas, Austin, TX.

**Sonja Tang** is currently a Postdoctoral Fellow, Department of Pediatrics, Emory University, Atlanta, GA. Tang was formerly affiliated with the Center of Biomedical Engineering, University of Kentucky, Lexington, KY.

**Timothy Wang** is now associated with the Division of Digestive and Liver Diseases, Columbia University College of Physicians and Surgeons, New York, NY. Wang previously had been affiliated with the Division of Gastroenterology, University of Massachusetts Medical School, Worcester, MA.

**Donald Watenpaugh** has accepted the position of Associate Director, Sleep Consultants, Fort Worth, TX. Watenpaugh was formerly a Research Scientist with Naval Submarine Medical Research Laboratory, Groton, CT.

**B. Stanley Willenbring** has joined the Department of Science & Mathematics, Jefferson College of Health Sciences, Roanoke, VA. Willenbring formerly was with the Department of Biology, Anne Arundel Community College, Arnold, MD.

**Thad E. Wilson**, an Assistant Professor, moved to the Department of Pharmacology & Physiology, Drexel University College of Medicine, Philadelphia, PA. Wilson was previously a Research Associate with the Division of Cardiology, Penn State College of Medicine, Hershey, PA.

**Ronald Wolff** recently joined Nektar Therapeutics as a Nektar Fellow, San Carlos, CA. Wolff had been a Senior

Research Scientist with Greenfield Labs, Lilly Research Labs, Greenfield, IN.

**Tamaki Yamada** has accepted the position of Chief of Center, Department of Public Health Center, Okazaki Medical Association,

Okazaki, Japan. Yamada was formerly Research Director, 1st Department of Internal Medicine, Nagoya City University Medical School, Nagoya, Japan.

**Scott Zimmerman** is currently affiliated with the Department of

Biomedical Sciences, Southwest Missouri State University, Springfield, MO. Zimmerman formerly was associated with the Department of Biology, University of Wisconsin-Stout, Menomonie, WI. ❖

## Positions Available

### Postdoctoral Positions

**Postdoctoral Position and PhD Student Position:** Within the department of Physiology, section Cell Physiology, of the Radboud University Nijmegen Medical Center, we are seeking a Postdoctoral and a PhD student. The section Cell Physiology has a long-standing tradition in transport physiology in epithelia and build up a substantial know-how and infrastructure in the field of molecular and cellular physiology of water and electrolyte transport. The department is, together with basic science and research-oriented clinical departments of the Radboud University Nijmegen, housed in the "Nijmegen Center of Molecular Life Sciences (NCLMS)." This new setting has created a unique scientific infrastructure allowing stimulating and innovative science. The  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  reabsorbing activity of the kidney determine the net excretion of these divalent ions for the entire body and, therefore, the body  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  balance. The maintenance of this balance is of crucial importance for many vital physiological functions, including neuronal excitability, muscle contraction, and bone formation. In healthy adults, the renal excretion of  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  is critically balanced by gastrointestinal absorption. A major breakthrough in completing the molecular details of the above-mentioned pathways was the recent identification of the Transient Receptor Potential channel (TRP) superfamily. Our group identified the

epithelial  $\text{Ca}^{2+}$  channel family that consists of two members TRPV5 and TRPV6. Recently, another TRP channel (TRPM6) was postulated as the renal  $\text{Mg}^{2+}$  influx mechanism. The epithelial  $\text{Ca}^{2+}$  channels could be involved in the multifactorial pathogenesis of disorders ranging from idiopathic hypercalciuria, stone disease and postmenopausal osteoporosis, whereas TRPM6 was mutated in patients with hypomagnesemia with secondary hypocalcemia (HSH). TRPV5, TRPV6 and TRPM6 display the defining properties for being the gatekeepers in active  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  reabsorption and are prime targets for hormonal control of  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  flux from the urine space to the blood compartment. Our recent studies substantiate the gatekeeper function of TRPV5 by showing that TRPV5 knockout mice display a robust hypercalciuria causing a compensatory  $\text{Ca}^{2+}$  hyperabsorption and disturbed bone formation. Understanding the molecular mechanism by which idiopathic hypercalciuria and HSH occurs, would allow clinical investigators to screen families with the disease before the onset of the overt disease and possibly direct treatment at the specific underlying molecular defects. Projects aim, therefore, to unravel the mechanism of  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  (re)absorption to provide insight in the molecular basis of these diseases. Requirements: Postdoctoral (two-three years): PhD in biomedical sciences, experience with molecular biology; permission to work with animals is a preference (art. 9). Salary for Postdoctoral will be

dependent on the qualifications and experience from Euro 2625,- up to a maximum of Euro 4027,- (gross amount). PhD student (three-four years): finished university education in (medical) biology or chemistry (masters or drs.); experience with molecular biology; permission to work with animals is a preference (art. 9). Salary for PhD from Euro 2179,- (gross amount). Information and Application: Further information can be obtained from Dr. J. Hoenderop (+31-24-3610571) or Prof. Dr. R. Bindels (+31-24-3614211). Detailed information about the vacancies can also be found at <http://www.ru.nl/fysio>. Applicants should send a letter of intent outlining special interest in the position, overall related qualifications, experience and career goals, a curriculum vitae, including a list of publications, and names and addresses of three professional references to [j.hoenderop@ncmls.ru.nl](mailto:j.hoenderop@ncmls.ru.nl). The position will be open until filled.

**Postdoctoral Fellowship:** A postdoctoral position in muscle metabolism and physiology is currently available in the laboratory of Dr. Ronald G. Haller at the Institute for Exercise and Environmental Medicine in Dallas, TX, <http://www.ieemphd.org>. The Institute for Exercise and Environmental Medicine is affiliated with the University of Texas Southwestern Medical Center at Dallas. This position is currently funded from departmental sources. The applicant must have a PhD, MD, or comparable doctoral degree. The ideal

candidate will have a strong publication record and excellent communication and laboratory skills. Salary is commensurate with experience according to NIH stipend levels. The fellow will be an employee of Presbyterian Hospital of Dallas and, thus, will receive comprehensive fringe benefits including medical, dental, and life insurance. Please send a statement of research interests, curriculum vitae, sample publications, and the names of three references to Ronald G. Haller, MD, Director, Neuromuscular Center, Institute for Exercise and Environmental Medicine, Presbyterian Hospital of Dallas, 7232 Greenville Ave, Dallas, TX 75231; Email: Ronald.Haller@UTSouthwestern.edu and Fax to Sherry Burnside at 214-345-4618. [EOE]

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**Postdoctoral Research Position:**

An NIH-funded postdoctoral position is immediately available to study the cellular and behavioral mechanisms underlying fluid and electrolyte balance. A range of projects are available, including the application of RNA interference to study tachykinin receptor involvement in vasopressin release and salt intake, confocal microscopy to follow receptor trafficking in brain during hyperosmolarity and hypovolemia, and the effects of in utero sodium exposure on mature brain function and ingestive behavior. Applicants must have a PhD or equivalent in Neuroscience or a related field, and superior communication skills in English. We seek individuals with a strong background in one or more of the following areas: behavioral neuroscience, cell biology, confocal or transmission electron microscopy. The University of Wyoming is located two hours from Denver, CO and is positioned between two mountain ranges, providing opportunity for a variety of outdoor activities. The fellow will have the opportunity to interact with faculty and students in the NIH funded Neuroscience Center, and will have ready access to the Microscopy and Macromolecular Analytic CORE facilities. Salary will be commensurate with NIH guidelines. Interested applicants should send a cover letter, cur-

riculum vitae, and the names and contact information of three references. Send this material to: Francis W. Flynn, PhD, Neuroscience Program, Department 3166 University Station, University of Wyoming, Laramie, WY 82071, USA. Email: flynn@uwyo.edu; Fax 307-766-5625.

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**Postdoctoral Position as a laboratory leader:**

This position is offered by the Department of Physiology, University of Tübingen, Germany (chairman Florian Lang). The applicant must be outstanding and willing to guide three to five junior scientists. Expertise in molecular biology is preferred but not required for recruitment. She/he should interact with other groups of the department analyzing regulation of channels and transporters in apoptotic cell death and their impact on kidney, intestine, cardiovascular function or host pathogen interaction. The department hosts excellent scientists from more than a dozen countries. The department language is English and knowledge of German is not required for recruitment. Tübingen is one of the oldest German Universities, and has been rated the city with highest life quality of Germany.

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**Postdoctoral Fellowship:**

The Samuel Lunenfeld Research Institute, Mount Sinai Hospital, University of Toronto, seeks applicants for a Postdoctoral Fellowship in Fetal Gene Therapy, CIHR Program in Development and Fetal Health. A CIHR-funded postdoctoral position using mice as models for fetal gene therapy research is available immediately. The project will utilize novel ultrasound-guided access to deliver RNAi or other agents in vivo during murine placental development. The effect of altering normal or correcting abnormal gene expression on chorio-allantoic placental development will be studied. This is an exciting opportunity for a PhD, MD or DVM graduate to train in a world-class reproductive science group using state-of-the-art techniques. Experience in molecular techniques, embryology, and/or ultrasonography is desirable. Research will be performed pri-

marily in the laboratories of Dr. S. Lee Adamson and Dr. John Kingdom in the Samuel Lunenfeld Research Institute (<http://www.mshri.on.ca>). Salary for this two to three year position will reflect training and experience in accord with the Institute's PDF pay-scale. To apply, please send a cover letter explaining why you are interested in this position, your CV, and the names, phone numbers and email addresses of two to three references to adamson@mshri.on.ca or jkingdom@mtsina.on.ca.

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**Postdoctoral Position:**

An Evolutionary Physiology postdoctoral position is available immediately at The College of William and Mary, renewable through May 2009, to investigate the evolution of complex neuroendocrine pathways. Applicants should have a PhD prior to starting the position and experience in one or more of these areas: physiological ecology, neuroendocrinology, behavior, evolutionary biology, physiology, or cell and molecular biology. The research focus is on the contribution of genetic variation and phenotypic plasticity to the evolution of a complex neuroendocrine pathway in mammals. This pathway integrates photoperiod and other environmental information to regulate reproductive, physiological and behavioral responses to seasons. The model system is a wild-derived laboratory colony of white-footed mice. The successful candidate will conduct collaborative research and assist in teaching one course in one semester, probably animal physiology. More details on the research are available at: <http://faculty.wm.edu/pdheid>. The College of William and Mary is a "Public Ivy" with 5,500 undergraduate enrollment, an excellent undergraduate program, and a strong research tradition. Starting salary is \$35,000 plus benefits. Please send curriculum vitae, a brief description of research interests/experience, and the names and contact information of three references to: Dr. Paul Heideman, Chair, Department of Biology, PO Box 8795, College of William and Mary, Williamsburg, VA 23187-8795; Email: pdheid@wm.edu. Review of applications begins immediately and contin-

ues until the position is filled.  
[AA/EOE]

**Postdoctoral Position:** An Evolutionary Physiology postdoctoral position is available immediately at The College of William and Mary, renewable through May 2009, to investigate the evolution of complex neuroendocrine pathways. Applicants should have a PhD prior to starting the position and experience in one or more of these areas: physiological ecology, neuroendocrinology, behavior, evolutionary biology, physiology, or cell and molecular biology. The research focus is on the contribution of genetic variation and phenotypic plasticity to the evolution of a complex neuroendocrine pathway in mammals. This pathway integrates photoperiod and other environmental information to regulate reproductive, physiological and behavioral responses to seasons. The model system is a wild-derived laboratory colony of white-footed mice. The successful candidate will conduct collaborative research and assist in teaching one course in one semester, probably animal physiology. More details on the research are available at: <http://faculty.wm.edu/pdheid>. The College of William and Mary is a "Public Ivy" with 5,500 undergraduate enrollment, an excellent undergraduate program, and a strong research tradition. Starting salary is \$35,000 plus benefits. Please send curriculum vitae, a brief description of research interests/experience, and the names and contact information of three references to: Dr. Paul Heideman, Chair, Department of Biology, PO Box 8795, College of William and Mary, Williamsburg, VA 23187-8795; Email: [pdheid@wm.edu](mailto:pdheid@wm.edu). Review of applications begins immediately and continues until the position is filled. [AA/EOE]

**Postdoctoral Position:** Position is currently available in molecular imaging program, Section of Cardiovascular Medicine, Yale University School of Medicine. Position in multidisciplinary laboratory focused on targeted imaging of myocardial angiogenesis and post-infarction remodeling, coronary physiology, and myocardial mechanics. Laboratory employs small

and large animal models of ischemic injury to develop non-invasive imaging approaches for assessment of myocardial angiogenesis and remodeling. NIH funded projects involve cardiovascular imaging of large and small animals with multiple modalities, including; 3D echocardiography, single photon emission computed tomography (SPECT), microSPECT, microCT, angiography, and magnetic resonance imaging. Applicant should hold PhD and/or MD degree, and have strong background in cardiovascular physiology with some experience in immunohistochemistry, animal surgery, or imaging. Please send a statement of research interests, curriculum vitae, and three letters of reference to Albert J. Sinusas, MD, Director of Animal Research Laboratories, Section of Cardiovascular Medicine, Yale University School of Medicine, PO Box 208017, New Haven, CT 06520-8017; Email: [albert.sinusas@yale.edu](mailto:albert.sinusas@yale.edu).

**Postdoctoral Position:** A postdoctoral position is available immediately in the Department of Pharmacology, School of Medicine, University of California, Davis. Our research is aimed at understanding: 1) how the intrinsic and synaptic properties of neurons in autonomic regions of the brain contribute to acute and long-term regulation of blood pressure; and 2) how changes in these properties contribute to cardiovascular consequences such as occurs with diabetes, depression, heart failure, exercise, and exposures to environmental pollutants. The position is funded by NIH grants to study central regulation of cardiovascular and pulmonary systems using genetic, imaging and electrophysiological approaches. Applicants should have a PhD degree and strong research background as evidenced by peer-reviewed publications in international journals. Preference will be given to those with experience in basic techniques in molecular biology, electrophysiology, protein biochemistry, fluorescence imaging, or immunohistochemistry. However, all talented and highly motivated candidates are encouraged to apply. Appointment and salary are depend-

ent on experience. Interested applicants should send (email is preferable) a letter of interest, curriculum vitae, and the names and addresses of three references to: Ann C. Bonham, PhD, Department of Medical Pharmacology and Toxicology, University of California, Davis, One Shields Avenue, GBSF Room 3502, Davis, CA 95616-0635; Tel: 530-752-3200; Fax: 530-752-7710; Email: [acbonham@ucdavis.edu](mailto:acbonham@ucdavis.edu); <http://pharmacology.ucdavis.edu>.

**Postdoctoral Fellow Position:** Opportunities for a postdoctoral fellow to work on the molecular basis of hormonal signaling at Colorado State University (<http://www.cvms.colostate.edu/bms/sanborn.htm>). Expression and regulation of capacitative calcium channels: Use Q-RT-PCR, siRNA, fluorescent imaging and other techniques to investigate the contribution of specific release-stimulated  $Ca^{2+}$  entry channels to calcium dynamics in smooth muscle myometrial cells. Role of scaffolding proteins in signaling crosstalk pathways involving cAMP and phospholipase C activation: Use molecular and cell biology approaches, immunoprecipitation, protein biochemistry and fluorescence microscopy to elucidate signaling mechanisms, hormonal control, functional significance of localized signaling domains involved in calcium homeostasis in myometrial cells and tissues. The laboratory is located in the Department of Biomedical Sciences at the Animal Reproduction and Biotechnology Laboratory in the front-range foothills of the Rocky Mountains. Two University Programs of Scholarly Excellence, two NIH Training Grants, and active graduate programs support the strong research emphases in reproductive biology and neurobiology in the Department of Biomedical Sciences and provide a stimulating environment for advanced training experience. Applicants must have a PhD or equivalent. Applicants must be willing to assume primary responsibility for the design and execution of the project agreed upon and the communication of the results to the scientific community. Applicants will be expected to participate in labo-

ratory and departmental activities including journal clubs and retreats. Starting date and salary are negotiable. Applications will be reviewed after February 15, 2005 and search continued until an appropriate candidate is found. Send resume and three letters of reference to: B.M. Sanborn, PhD, Professor and Head, Department of Biomedical Sciences, 102 Physiology Campus Delivery 1680, Colorado State University, Fort Collins CO, 80523; Tel.: 970-491-4263; Fax: 970-491-7569; Email: Barbara.Sanborn@colostate.edu. The Office of Equal Opportunity is located in 101 Student Services. In order to assist Colorado State University in meeting its affirmative action responsibilities, ethnic minorities, women and other protected class members are encouraged to apply and to so identify themselves. [AA/EOE]

**Postdoctoral Position:** Exercise/Aging/Energy Metabolism. Description: A postdoctoral position is immediately available to work on NIH funded research examining exercise and diet interventions in the treatment of insulin resistance in aging. Our laboratory utilizes a bench-to-bedside approach to tackle the complex problems arising from a sedentary lifestyle in today's modern world. This is an opportunity to develop skills and research training in human clinical studies at the whole body, cellular, and molecular level. The research environment at Case Western Reserve University School of Medicine and the Schwartz Center for Metabolism and Nutrition at MetroHealth Medical Center offers outstanding potential for interdisciplinary collaboration and training. Qualifications: applicants must have a PhD, or equivalent degree, with a background in Physiology, Exercise Physiology, Nutrition, or a related area of science. Expertise in Western blot analysis, immunoblotting, RT-PCR, Elisa and RIA procedures is desirable. Good writing skills are essential. Responsibilities: primary responsibilities will include management and implementation of the muscle component of the study specifically, examining the mechanisms of insulin resist-

ance in skeletal muscle. Additional responsibilities will include subject recruitment, data analysis, and manuscript and grant writing. Opportunities to participate in all aspects of the research are also available including data collection using the euglycemic clamp procedure, stable isotopes, calorimetry, body composition, CT and NMR scanning, exercise and dietary interventions. Application Information: send a letter of application, CV, transcripts and contact information of three professional references to: John P. Kirwan, PhD, Schwartz Center for Metabolism and Nutrition, Case Western Reserve University School of Medicine, MetroHealth Medical Center, Rm. G733B, Bell Greve Bldg., 2500 MetroHealth Drive, Cleveland, OH 44109; Tel.: 216-778-8848; Email: john.kirwan@case.edu.

**Postdoctoral Position:** The Howard Florey Institute, University of Melbourne, Victoria, Australia is looking to fill a postdoctoral position in Cardiovascular Physiology/Pharmacology in the Systems Neurobiology Group. The salary is from \$51,057, depending on qualifications and experience. Applications are invited from motivated individuals who would like to contribute to an exciting research program investigating the causes of sympathetic dysregulation in heart failure. This project is funded by a recent four-year grant from the National Institutes of Health, USA. The project involves simultaneous recording of cardiac and lumbar sympathetic nerve activity and investigation of the factors controlling activity in the normal state and the causes of the increased activity in heart failure. In particular, the role of central mechanisms, systemic humoral factors, cardiovascular reflexes, and the responses to pharmacological treatments will be studied. Previous experience working with large animals or with sympathetic nerve recording would be an advantage but is not essential. The successful candidate will have: a PhD in physiology/pharmacology, ideally in cardiovascular or autonomic research; experience in integrated physiological studies; the ability to take a major role in the management of the project; the ability to supervise research staff and

PhD students; strong interpersonal, oral and written communication skills in English; and a strong team focus an excellent publication record. Information on this position can be obtained from Dr Clive May; Email: c.may@hfi.unimelb.edu.au. Please send a complete CV to: Mr. Sanam Sharma, Human Resources Department, Howard Florey Institute, University of Melbourne VIC 3010 Australia; Email: s.sharma@hfi.unimelb.edu.au.

## Faculty Positions

**Assistant/Associate Professor:** The Department of Biological Sciences, Central Washington University, invites applications for an Animal Physiologist with a strong dedication to teaching and involving students in research. Our dynamic faculty is housed in a beautiful new teaching and research facility that supports a small Master's program. Applicants with a commitment to excellence in teaching who can recruit and serve an increasingly diverse student body are especially encouraged to apply. CWU has an established policy permitting shared appointments. Any two people (e.g., dual career couples) interested in contractually sharing this position should apply jointly. Responsibilities: The successful candidate will teach human physiology, comparative physiology, possibly a specialty course within her/his area of expertise, and general biology offerings for majors and non-majors. A normal teaching load is two courses with lab each quarter (12 contact hours). Research involving students is expected, as are continued scholarly activity through an externally funded research program, advising, and service activities. We are looking for a candidate who has the potential to forge links among our department strengths in ecology, organismal biology, and molecular biology. Research areas that could complement our current expertise include, but are not limited to, entomology, parasite-host interactions/parasitology, organismal physiology and adaptation, and plant-animal interactions. Physiologists specializing in insect systems are espe-

cially encouraged to apply. Qualifications Required: Broad academic background in biology and physiology; PhD in appropriate discipline; Research experience in animal physiology. Preferred: Background/training in entomology and physiology of insects and/or other invertebrates. Rank: Assistant/Associate Professor. Contract Type: Full-time nine-month academic appointment (three academic quarters per year), tenure-track position. Appointment will begin in September 2005. Salary Range: commensurate with experience and competitive with like institutions. Inquiries and Applications: Applicant screening will begin January 5, 2005, and will continue until the position is filled. For details about our department, please visit our website at: <http://www.cwu.edu/~biology/>. To apply, please submit 1) a cover letter addressing the responsibilities and qualifications outlined above; 2) statements of a) teaching philosophy and b) research interests/goals; 3) a full curriculum and vitae; 4) copies of academic transcripts; and 5) names and contact information for three references to: Dr. Daniel Beck, Chair, Animal Physiologist Search Committee, Department of Biological Sciences, Central Washington University, 400 E. University Way, Ellensburg, WA 98926-7537; Tel: 509-963-2886; Fax: 509-963-2730; Email: becd@cwu.edu.

**Assistant Professor:** The University of Manitoba Department Of Oral Biology, Faculty of Dentistry invites applications for a full-time tenure track appointment at the Assistant Professor level, commencing July 1, 2005 or as soon after this date as possible. Applicants must have a PhD and/or DMD/DDS and published evidence of research ability. Salary will be commensurate with experience and qualifications. For a clinically qualified individual, candidates must be eligible for licensure with the Manitoba Dental Association. Extra/intramural practice privileges are available two half days per week. The Department of Oral Biology (<http://www.umanitoba.ca/faculties/dentistry/programs7.a.htm>) is multidisciplinary and provides basic science

teaching to dental and dental hygiene students and carries out research in anatomy, biochemistry, proteomics, cell and developmental biology, oral physiology and microbiology. The applicant should be fluent in English and will be required to teach oral and general physiology to dental and dental hygiene students, and to participate in Faculty courses at the graduate level. The successful candidate will be expected to develop a strong externally-funded research program to complement ongoing research in the department. Opportunities exist for collaboration with clinical/basic science departments on the Health Sciences campus. Winnipeg is a prairie city with a population of 670,000 (<http://www.tourism.winnipeg.mb.ca>). Its ethnic diversity is notable and is celebrated through many annual festivals. Experience Winnipeg's world-class arts and entertainment, professional sports teams in a family-centered urban community. Winnipeg boasts a balanced lifestyle with affordability. Winnipeg is located close to superb outdoor recreational activities with a wide variety of lakes, beaches, and wilderness areas within an easy drive of the city. The University of Manitoba encourages applications from qualified women and men, including members of visible minorities, Aboriginal peoples and persons with disabilities. All qualified candidates are encouraged to apply, however Canadians and permanent residents will be given priority. The review of applications will begin on January 31, 2005 and will continue until the position is filled. Please refer to position # AKX 944 in all correspondence. A letter of application, including curriculum vitae, statement of research interests, the names and contact information, including Email addresses, of three referees should be forwarded to: Dr. R. Bhullar, Head, Department of Oral Biology, 780 Bannatyne Avenue, Winnipeg, Manitoba, Canada R3E 0W2; Email: [Bhullar@Ms.Umanitoba.Ca](mailto:Bhullar@Ms.Umanitoba.Ca); Fax: 204-789-3913. Application materials, including letters of reference, will be handled in accordance with Manitoba's *Freedom of Information and Protection of Privacy Act*.

**Assistant/Associate Professor:** The University Of Texas at Austin, Department of Kinesiology and Health Education, Cardiovascular Exercise Physiology, invites outstanding candidates to apply for a full-time, tenure-track faculty position beginning August 2005. The position is open at the rank of Assistant/Associate Professor. Responsibilities include attracting extramural funding, directing the Master's program in Clinical Exercise Physiology, supervising PhD students and teaching at the undergraduate and graduate levels. The successful candidate will hold a PhD or equivalent degree and an established research record in cardiovascular physiology and/or health utilizing human or animal models. Preference will be given to those applicants with extramural funding. Send letter of application with vitae including names and addresses of three references to: Roger Farrar, PhD, Department of Kinesiology and Health Education, 222 Belmont Hall, The University of Texas, Austin, TX 78712; (for questions: [rfarrar@mail.utexas.edu](mailto:rfarrar@mail.utexas.edu)). Review of applications began January 15, 2005. Applications will be accepted until the position is filled. [EOE]

**Faculty Positions:** California State Polytechnic University, Pomona, CA. The Department of Animal and Veterinary Sciences seeks an Assistant Professor of Animal and Veterinary Sciences with specialization in "Bioinformatics and Genomics/Biotechnology." A PhD, DVM or equivalent degree emphasizing Genomics/Proteomics and/or Food Animal Biotechnology is desired. Demonstrated experience with livestock breeding and quantitative genetics is preferred. Knowledge of research design and statistical application is desirable. The other position is an Assistant/Associate Professor of Animal and Veterinary Sciences with specialization in the science and processing of muscle as a food. This requires a PhD or equivalent in a discipline emphasizing muscle as a food. Demonstrated experience with the microbiological/biochemical aspects of



food safety and/or food security continuum (farm to plate) of muscle as a food is preferred. It is desired that candidates possess strength in food safety beyond the pre-harvest stage that includes knowledge of slaughter, processing, product handling or distribution. Responsibilities include teaching undergraduate and graduate courses, research and service. Review of applications will begin January 15, 2005 and will continue until the position is filled. Send completed academic application, Affirmative Action Applicant Data form, curriculum vitae, cover letter describing interest in and qualifications for this position, future teaching and research interests, names and contact information of three references we may contact and academic transcripts to: C.Y. Matsushima, Chair Search Committee, Department of Animal and Veterinary Sciences, 3801 West Temple Avenue, Pomona, CA 91768; Tel: 909-869-2210/2216; Fax: 909-869-2099; Email: cymatsushima@csupomona.edu. Candidates will be required to make formal presentations to faculty and/or students. A full description of the positions may be viewed at [http://www.csupomona.edu/~academic/faculty/positions/co\\_ag.htm](http://www.csupomona.edu/~academic/faculty/positions/co_ag.htm). Cal Poly Pomona hires only individuals authorized to work in the US and accepts degrees only from accredited institutions. [EOE]

**Assistant/Associate Professor:** The Departments of Biology and Health Studies & Gerontology of the University of Waterloo invite applications for a tenure track position at the Assistant or Associate Professor level in Mammalian Toxicology/Physiology. Applicants must have a PhD and post-doctoral experience and be prepared to establish an externally funded active research program. We are particularly interested in candidates using cellular and/or molecular approaches to explore an aspect of Mammalian Toxicology/Physiology, for example, toxicogenomics or biomarkers for human health. Duties include research, teaching at the undergraduate level and in the newly proposed Masters of Public Health program, and graduate student supervision. Candidates should be able to teach

courses in environmental toxicology related to human health. The ability to interact in collaboration with a multidisciplinary team is an asset. Salary will be commensurate with qualifications and experience. Applicants should send their curriculum vitae, the names of three individuals willing to furnish letters of reference, and an outline (one to two pages) of their proposed research program to: Chair, Department of Biology, Faculty of Science, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1. The closing date for applications is **February 28, 2005** with a start date after July 1, 2005. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority. The University of Waterloo encourages applications from all qualified individuals, including women, members of visible minorities, native peoples, and persons with disabilities. Additional information on the Department is available at <http://www.sci.uwaterloo.ca/biology>.

**Associate/Full Professor:** The Section of Neurobiology, Physiology and Behavior, in the Division of Biological Sciences, University of California, Davis, invites applications for a Physiologist at the associate or full professor level. Applicants specializing in any area of animal physiology consistent with the broad goals of the Section will be considered. Candidates with backgrounds in genomic approaches and genetic models of organ system development, function and disease are encouraged to apply. We are especially interested in candidates whose research can productively interact with programs in gender-based biology and/or metabolic control in the Division of Biological Sciences, the School of Medicine, and the School of Veterinary Medicine, and who have demonstrated ability as academic leaders. UC Davis, with one of the largest concentrations of life scientists in the world, has made a tremendous investment in the genome sciences that will complement and extend existing strengths in physiology across various units on campus. For more information on the position and UC

Davis in general, please visit the following web site: <http://www.npb.ucdavis.edu/facultyposition/>. Successful applicants will be expected to maintain a vigorous research program with continued extramural funding, and contribute to the teaching mission of the Section. Candidates must possess a PhD or MD degree with significant experience as an established independent investigator. Applicants should send a letter describing their research and teaching interests, a curriculum vitae, copies of representative publications, and the names of at least five persons from whom references can be obtained to: Chair, Physiology Search Committee, Section of Neurobiology, Physiology, and Behavior, One Shields Avenue, University of California, Davis, CA, 95616-8519. Review of applications will commence February 1, 2005, and the search will continue until the position has been filled. [EOE/AA]

**Assistant Professor:** The Department of Biological Sciences at Towson University invites applications for a tenure-track Animal Physiologist position at the Assistant Professor level beginning August 2005. Candidates must have a strong commitment to excellence in both teaching and research. Teaching responsibilities will include an undergraduate course in human anatomy and physiology and graduate and undergraduate courses in the individual's area(s) of specialization. The successful candidate is expected to establish an extramurally funded research program involving undergraduate students and MS candidates. PhD in an appropriate field is required, teaching and postdoctoral experience desirable. Modest "start-up" funds available. Qualified candidates should send a letter of interest, one-page descriptions of teaching philosophy and research plans, curriculum vita and photocopies of all transcripts, to: Dr. Jay A. Nelson, Animal Physiologist Search Committee Chair, Department of Biological Sciences, Towson University, 8000 York Rd., Towson, MD 21252-0001. The candidate should also direct at least three references to send confidential letters of support to the same

address. Review of applications will begin January 17, 2005. Additional information is available at our website: <http://www.towson.edu/biology>. Founded in 1866, Towson University today is recognized by US News & World Report as a top public university in the Northeast and Mid-Atlantic regions. Towson is nationally recognized for its programs in the liberal arts and sciences, business, education, communications, health sciences, and the fine and performing arts. The University places a strong emphasis on service learning and civic engagement through such activities as internships, practica, clinical placements, course assignments and student events. As the Baltimore area's largest university and Maryland's Metropolitan University, Towson articulates its research and scholarship mission through partnerships that link the University to the economic, educational and cultural life of the state of Maryland and the mid-Atlantic region. Towson enrolls more than 17,500 undergraduate and graduate students in 64 undergraduate majors, 35 master's programs and four doctoral programs. Located on a rolling 328 acres, the striking campus is eight miles north of downtown Baltimore and 45 miles from Washington, DC. The campus and its surrounding cities provide an excellent environment for teaching and supporting the academic pursuits of the 600 full-time faculty who work here. The Department of Biological Sciences is the largest of the seven departments within the College of Science and Math (CSM), carrying roughly 33 % of the 1,600 declared majors and 32 of the 120 full-time CSM faculty. The department is also the base of interdisciplinary programs in Molecular Biology, Biochemistry & Bioinformatics and Environmental Science & Studies. The goals of CSM and the Department of Biological Sciences have historically been realized by an emphasis on excellence in teaching. The commitment to teaching excellence in CSM has been aided by its evolution from an education institution and by the continued prominence of National Science Foundation funded science education programs within the departments of the College.

In addition, CSM encourages both faculty and students to engage in scientific and educational research. For faculty hired in the past 20 years, research activity is a requirement for promotion and tenure. Student-centered research is seen as an important component of an undergraduate education in Biology at Towson and can be funded through generous intramural competitive grants to students. [EOE/AA]

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**Faculty Position:** Full-time tenure-track Biology position (Position #2950/2763) at Saddleback College, Mission Viejo, CA begins Fall 2005. Assignment includes teaching lower division biology classes, including Human Physiology, Human Anatomy and Introduction to Biology or other courses in the pre-health and biology majors' sequence. Required Masters degree or higher in biological sciences, or Bachelors degree in biological sciences and a Masters degree in biochemistry, biophysics or physiology. Required minimum of one-year teaching experience in biological sciences at the college level. Saddleback College is a part of the South Orange County Community College District. Visit our website for a detailed job description and application at <http://www.socccd-jobs.com> or contact us at 949-582-4850. Closing date to apply: **February 14, 2005** 4:00 p.m.

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**Faculty Positions:** The Department of Cell Biology and Physiology at the University of Pittsburgh School of Medicine invites applications for tenure-track positions at all professorial levels. Departmental research strengths include: epithelial cell biology, regulation of membrane traffic of proteins and lipids and the regulation of gene expression and signal transduction in endocrine systems. We seek individuals whose research will interface with and extend the existing strengths of the Department and those of the broader institution. Individuals working in model systems are also encouraged to apply. Space and start-up funds will be provided by the Department of Cell Biology and Physiology. Applicants should have a PhD and/or MD degree and postdoc-

toral experience. Send curriculum vitae, summary of research interests and names of three references to: Raymond A. Frizzell, PhD, Department of Cell Biology and Physiology, University of Pittsburgh School of Medicine, S367 Biomedical Science Tower, 3500 Terrace Street, Pittsburgh, PA 15261. [AA/EOE]

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**Assistant Professor:** Endocrinologist or Molecular Physiologist, University of Alaska Anchorage, PCN: 304065. The University of Alaska-Anchorage invites applications for a tenure-track, tripartite faculty position at the assistant professor level in the Department of Biological Sciences. The Department of Biological Sciences offers undergraduate (BS, BA) and graduate (MS) degrees in Biological Sciences, and collaborates with the University of Alaska Fairbanks to confer a PhD degree. The Department is the academic home to 17 tenure-track faculty, two part-time faculty, and five tenured faculty of the Biomedical Program (WWAMI). Academic and research focus areas within the Department include cell and molecular biology, ecology/evolutionary biology, and environmental physiology. The Department is strongly devoted to teaching excellence, strong science, and collaborative integration in teaching and research. Additional details regarding the Department's faculty and research interests can be found at <http://www.biology.uaa.alaska.edu>. Responsibilities: The incumbent develops a strong research program in the area of endocrinology or molecular physiology, obtains extramural funding, and contributes to the development of the integrative physiology research group within Alaska Experimental Programs to Stimulate Competitive Research. The assistant professor teaches two courses and one graduate seminar per year. The standard five-parts workload consists of three-parts research, one-part teaching, and one-part university and/or public service. Qualifications: A PhD in biology or relevant scientific field is required. Candidate must have prior postdoctoral research experience; first authored a publication in a refereed journal; and previous teaching/

research experience in a relevant area. Applicant must have demonstrated ability to obtain extramural funding and establish an independent research program. Review Date: Review of applications will begin on January 27, 2005, and will continue until position is successfully filled. Application Process: We do not accept application materials via Email. Please carefully follow the specific instructions given on each vacancy announcement. Please direct inquiries to Dr. Ian van Tets, Department of Biological Sciences, via email (afivt@uaa.alaska.edu) or by telephone (907-786-4705). The application packet for this position **must** include: A University of Alaska Applicant Form, mandatory when applying for any UA position (available on our website at <http://www.uaa.alaska.edu/uaahrs>); a cover letter (please note the PCN 304065 on your cover letter); a detailed professional vita containing educational preparation, work experience, research and publications; copies of teaching/student evaluations; names, email addresses, and telephone numbers of three (3) professional references; and copy of college transcripts verifying terminal degree (official transcripts will be required prior to hiring). Please submit the application packet to: Human Resource Services, University of Alaska Anchorage, Administration Building, Rm 125 (Physical Address), 3211 Providence Drive (Mailing Address), Anchorage, AK 99508-4614. The complete vacancy announcement is available on the UAA/HRS website at <http://www.fin-sys.uaa.alaska.edu/uaahrs> or in UAA's Human Resource Services office located in the Administration Building on Alumni Drive, Anchorage, AK. Tel: 907-786-4608; Hearing Impaired TTY Phone: 907-786-1420. [AA/EOE]

**Assistant Professor, Veterinary Physiologist:** The Department of Physiological Sciences, College of Veterinary Medicine, Oklahoma State University invites application for a tenure-track position in veterinary physiology at the rank of Assistant Professor. Applicants must have a PhD in physiology or a closely related

discipline. Candidates with the DVM or equivalent veterinary degree are preferred. Responsibilities include instruction of core veterinary physiology courses in the professional veterinary curriculum, development of an extramurally-funded research program, and participation in the Veterinary Biomedical Sciences graduate education program. Opportunities exist for collaboration with other research faculty in the College, the University of Oklahoma Health Sciences Center, and other OSU departments involved with research in physiology, pharmacology, and internal medicine. Interested individuals should send an application including curriculum vitae, statement of professional goals, and names of three references to Dr. Cyril Clarke, Professor and Head, Department of Physiological Sciences, 264 McElroy Hall, College of Veterinary Medicine, Stillwater, OK 74078; Tel: 405-744-8093; Email: Clarke@okstate.edu. To ensure full consideration, applications should be received by **February 28, 2005**, and review of applications will continue until a suitable candidate is identified. [AA/EOE]

**Assistant Professor:** Kean University's New Jersey Center for Science & Technology Education five-year combined bachelor/master program Assistant Professor, tenure track, PhD required; specializing in molecular or cellular biology. Effective September 1, 2005. Primary teaching responsibilities include undergraduate systems biology and graduate level molecular biotechniques, and other courses according to qualifications. Applicants with biotech or pharma industry experience encouraged to apply. Commitment to teaching excellence, an integrated science curriculum and scholarly research required. Send curriculum vitae, statement of research interests, statement of teaching philosophy and three recommendation letters to: Dr. Laura Lorentzen, Acting Chairperson, Center for Science & Technology, Kean University, 1000 Morris Ave., Union, NJ 07083. [AA/EOE]

## Research Positions

**Research Scientist:** The University of Texas Health Science Center at Houston/Division of Pediatric Cardiac Surgery is seeking a Senior Research Associate or Research Scientist. The candidate will help set up and run a research laboratory in the Division of Pediatric Cardiac Surgery. Investigations will have clinical implications to cardiology and cardiac surgery and will involve procedures on experimental animals. Areas of investigation include ischemia/reperfusion, hypoxia/re-oxygenation, DHCA, and the effect of ventricular geometry on cardiac function. Experiments will include a variety of animal models, hemodynamic measurements, biochemical assays, and molecular techniques. The candidate will also aid in the preparation of grants, protocols, and papers, as well as oversee technicians. Candidates must have a DMV, PhD, or MD with at least four years of postdoctoral experience. Interested candidates should submit their application via our website at <http://jobs.uth.tmc.edu>. The position is listed as a Research Scientist with the Cardiothoracic Vascular Surgery Department. Requisition number 040547. Applications are only accepted via our job website at <http://jobs.uth.tmc.edu>. If you have any questions regarding this employment posting, please contact the Human Resources Department at 713-500-3130 or via Email at [jobs@uth.tmc.edu](mailto:jobs@uth.tmc.edu). This job class may contain positions that are security sensitive and thereby subject to the provisions of Texas Education Code 51.215. [EOE/AA]

**Senior Research Associate Position:** Opportunities for a research associate to work on the molecular basis of hormonal signaling at Colorado State University (<http://www.cvmb.colostate.edu/bms/sanborn.htm>). Expression and regulation of capacitative calcium channels: Use Q-RTPCR, siRNA, fluorescent imaging and other techniques to investigate the contribution of specific

release-stimulated  $\text{Ca}^{2+}$  entry channels to calcium dynamics in smooth muscle myometrial cells. Role of scaffolding proteins in signaling crosstalk pathways involving cAMP and phospholipase C activation: Use molecular and cell biology approaches, immunoprecipitation, protein biochemistry and fluorescence microscopy to elucidate signaling mechanisms, hormonal control, functional significance of localized signaling domains involved in calcium homeostasis in myometrial cells and tissues. The laboratory is located in the Department of Biomedical Sciences at the Animal Reproduction and Biotechnology Laboratory in the front-range foothills of the Rocky Mountains. Two University Programs of Scholarly Excellence, two NIH Training Grants, and active graduate programs support the strong research emphases in reproductive biology and neurobiology in the Department of Biomedical Sciences and provide a stimulating environment for advanced training experience. Applicants must have an MS and extensive experience or a PhD or equivalent with some postdoctoral experience. Applicants must be willing to assume primary responsibility for the design and execution of the project agreed upon and the communication of the results to the scientific community. Applicants will be expected to participate in laboratory and departmental activities including journal clubs and retreats. Starting date and salary are negotiable. Applications will be reviewed after February 15, 2005 and search continued until an appropriate candidate is found. Send resume and three letters of reference to: B.M. Sanborn, PhD, Professor and

Head, Department of Biomedical Sciences, 102 Physiology Campus Delivery 1680, Colorado State University, Fort Collins CO, 80523; Tel.: 970-491-4263; Fax: 970-491-7569; Email: Barbara.Sanborn@colostate.edu. The Office of Equal Opportunity is located in 101 Student Services. In

order to assist Colorado State University in meeting its affirmative action responsibilities, ethnic minorities, women and other protected class members are encouraged to apply and to so identify themselves. [AA/EOE].

## Advertise your job vacancy to over 10,000 members and subscribers!

Ads are accepted for either positions available or positions wanted under all categories. The charge is only \$75. All ads are also posted on the APS Career Opportunity Web page upon receipt for a three month period.

If you would like to have your ad listed in *The Physiologist* or on the APS Career Opportunities Web page (<http://www.the-aps.org/careers/careers1/posavail.htm>),

the following items are needed: a copy of the ad, the name of a contact person, and either a purchase order number, credit card number (with expiration date and name of cardholder) or billing address. Send the information to Linda Dresser (Email: [ldresser@the-aps.org](mailto:ldresser@the-aps.org); Tel: 301-634-7165; Fax: 301-634-7241).

## Letter to Beverly Bishop

**Mortimer Civan** writes: "Thank you very much for your kind note on the occasion of a milestone birthday.

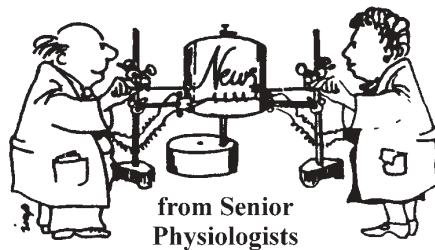
"In response to your query, I remain very much engaged in scientific inquiry and continue to participate in teaching medical and graduate students. I remain awed by the beauty and intricate complexity of physiology and at the increasingly powerful tools becoming available to address these complexities, both as an intellectual challenge and an opportunity to better and to prolong human life. In my own laboratory, what we shall be doing in the coming year is different from what we did last year. Each year brings new challenges and opportunities. I remain rejuvenated by my students and fellows, and by the lively, collegial and imaginative members of my Department.

"I am reminded of the first lecture I attended as an incoming student at the Columbia University College of Physicians and Surgeons. The Nobel Laureate Albert Szent-Gyorgyi confessed that he had not gone into science to gain information. For that purpose, a far more efficient approach would have been to have immersed himself in a library. He had entered science because it was good fun! I find that the fun remains, and happily, NIH has just concluded that the output from my laboratory justifies continued support of my scientific enthusiasms."

## Letters to G. Edgar Folk

**Hugh Huxley** writes: "Many thanks for your very kind birthday card. I am still finding interesting things to do and think about in the lab (unpaid), and am in pretty good health and enjoying life. Lots of meetings (six so far!) this year. Celebrating 50 years of sliding filaweats."

**Homayoun Kazemi** writes: "Thank you for your recent letter and inquiry about what I am up to at the moment. I have enjoyed my life in academic medicine through the years, and after some 31 years, as head of the Pulmonary and Critical Care Unit at MGR, I stepped down



from that post when I reached the age of 65 some five years ago. Following that, I spent a year on sabbatical in the Department of Physiology at University of California, San Diego working with Frank Powell on neurotransmitters and respiratory control, which has been a major interest of mine through most of my professional life. Since returning to Boston, I have continued with some clinical activities and teaching. The latter has included Harvard medical students and residents as well as post-graduate fellows in pulmonary medicine. I have continued my interest in respiratory control and organized the Oxford Conference on Respiratory Control and Modeling in Falmouth, MA in 2000. It was a wonderful gathering, and it allowed us to get together with Colleagues from all around the globe.

"The part of my activities that I have enjoyed the most through the years is to apply physiological principles to management of patients with various respiratory and cardiovascular problems. I have always felt that a good understanding of systems physiology is essential in providing scientific basis for medical care. This has stood me in good stead through the years. Now, in this new age of cellular and molecular biology and genetics, I think the message that we need to pass on the next generation of scientists is that physiological principles are applicable in this new world, and without it, we will not get very far. I am happy to say that many of my colleagues who are more interested in cellular and molecular biology are now coming to us to apply their findings and use physiology in management of disease. Indeed, it has been a wonderful life. I have enjoyed what I have done, and hope to continue doing some of the same for some time to come."

**Jean Himms-Hagen** writes: "Thank you for the birthday greetings in December 2003. Your letter took me by surprise, even although I have been reading "Senior Physiologists' News" for years. I apologize for the delay in replying, a consequence of two relatively disastrous years, summarized below, from which I am now thankfully more or less recovered.

"Unknown to me or to anyone else, I was slowly developing normal pressure hydrocephalus (NPH) as a consequence of an acoustic neuroma. The neuroma was diagnosed in 2001 and treated in 2002 with fractionated stereotactic radiation. The NPH, however, persisted and the problem it produced with walking eventually led me to fall and shatter my elbow. It took five weeks in hospital for a team of specialists and students to work out why I fell, to understand why I was so sick when I had only broken my elbow, and to plan and execute the surgical treatment (implantation of a ventriculo-peritoneal shunt). After I was allowed home, Paul and I decided that we could no longer continue to look after our large house, so we moved to an apartment in a nearby retirement residence, where we now live independently, but have the availability of help if needed. The move, which required condensing 48 years of possessions into two rooms, consumed most of my energy for several months. More recently, at the request of the University, I also condensed the office, which I had inhabited for 20 years, into a single small desk, a change that also required much energy.

"Fortunately, my recovery from a state that in some respects mimicked Alzheimer's and that had left me unable to walk has been quite spectacular. Mental and physical activity have now largely returned to normal and I have resumed reading of the literature and writing of reviews. My latest invited review on thermogenesis and obesity has just been published and reprint requests are already coming in. The necessity in December 2003 for repeat surgery to remove the pins and wires from my elbow entailed no more than a brief interruption in my work. I feel extremely fortunate that the investigative curiosity and

skill of the MDs and students at our teaching hospital were able to retrieve me from a state that was directing me towards a long-term care home. This was an added bonus to the enjoyment I experienced from 40 years of teaching metabolism to medical students (even although my case did not test their knowledge of metabolism). I also feel very fortunate that as Professor Emeritus I continue to have free access to the vastness of the scientific literature from my home computer via the University library. I have already started on another review, spending the early morning hours, as always, immersed in science and thoroughly enjoying myself. I very much miss the former frequent personal contacts with colleagues at meetings, but hope to get back to them eventually.

"Paul and I used to travel quite a lot, both to scientific meetings all over the world and driving to visit one of our daughters, in Boston 20 years ago, now near Philadelphia where she lives with our son-in-law and two grandchildren, eight and 10 years old. The grandchildren continue to be source of great enjoyment and visit us here at least twice a year. However, we do miss being able to drive to their house to help take care of them once in a while. Happily, our other daughter lives here in Ottawa and visits us frequently.

"You ask for 'words of wisdom' to pass on to others. The only ones I can offer stem from my wonderment that I could actually be paid for over 50 years to do what I really enjoy and

very much want to do, namely, scientific research and teaching. My early elementary and high school education during the war years in Oxford had not led me to expect such. I grew up believing that work was necessary to earn the money needed to do other things one enjoyed. In my case, such an expectation turned out to be wrong. Subsequent experience has taught me that work can do both at the same time. I have never thought of my job as 'work.' My advice therefore is: find out what you really enjoy, then seek a position that employs you to do it.

"It was a pleasure to hear from someone I have known for so many years."

## Letter to Alan Hofmann

**David Megirian** writes: "My kind thanks for your letter of 24th April 2004. Your letter has been dangling over my workspace. It has reminded me that I shall begin the eighth decade of life near the end of the year.

"Yes, I'm still an active researcher. My current focus has turned to the use of gene-targeted mice in an effort to understand the role of tolerance to narcotic analgesics and the serendipitous findings that have emerged from this focus. The challenge to understand the place of molecular biology for one who has been a system's physiologist for many years is awesome. I have had to give up being a 'teacher' to become a 'student.' The learning curve is modest though enormously satisfying.

"Under the tutelage first of Harold C. Hodge at the Univ. of Rochester, NY he often reminded me and the other students within his compass: 'Remember that research is good, clean fun!' Hence, where ever and whenever I embark on a new research project I am ever mindful of Harold's words. I would say the same to all, not just tyros contemplating a career in research.

"I have a long-standing link with Beverly Bishop in Buffalo, another octogenarian. Both of us have spent many years studying neural control mechanisms of breathing, she chiefly on abdominal wall muscles while we in Hobart focused on the role of upper airway muscles. Then we shifted interest to circadian thermal and activity rhythms while I made a three-year stopover in Buffalo. We now often have telephone chats over 14 to 16 time zones several times a month.

"After many gypsy years of teaching and research I am anchored in Canberra, Australia. I have a small house with a delightfully small and walled garden. My great love, at the end of day in the lab, is to read fiction, biography, history and politics, especially the writings of Australian authors. My current one is Bryce Courtenay whom I must read with a Macquarie Dictionary to hand. My next door neighbor is a native French speaker; I have chances to have a natter with her, a language I adore." ❖

## APS Sustaining Associate Members

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



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Janssen Research Foundation  
Eli Lilly and Company  
The Mack Printing Group  
Merck and Company, Inc.  
Nycomed, Inc.  
Pfizer, Inc.  
Pharmacia and Upjohn, Inc.

Procter & Gamble Co.  
Rhone-Poulenc Rorer  
W. B. Saunders Company  
Schering-Plough Res. Inst.  
G. D. Searle and Company  
SmithKline Beecham Pharm.

*March 6-10*

**The Society of Toxicology (SOT) 44th Annual Meeting, New Orleans, LA.** *Information:* Internet: <http://www.toxicology.org/memberservices/meetings/am2005/index.html>.

*March 9-13*

**7th International Conference AD/PD 2005, Sorrento, Italy.** *Information:* Conference Secretariat, 7th AD/PD 2005, Kenes international, 17 Rue du cendrier, P.O. Box 1726, CH-1211 Geneva 1, Switzerland. Tel.: +41 22 908 0488; Fax: +41 22 732 2850; Email: [adpd@kenes.com](mailto:adpd@kenes.com); Internet: <http://www.kenes.com/adpd>.

*March 10-13*

**SCAN (Sports, Cardiovascular and Wellness Nutritionists dietetic practice group of the American Dietetic Association) 21st Annual SCAN Symposium, Charleston, SC.** *Information:* Dave Ellis, RD, LMNT, CSCS. Tel.: 402-250-5406; Email: [dave\\_ellis@mac.com](mailto:dave_ellis@mac.com); Internet: [http://www.scandpg.org/page.asp?id=meetings\\_and\\_events](http://www.scandpg.org/page.asp?id=meetings_and_events).

*March 18-19*

**2005 Gulf Coast Physiological Society Meeting, New Orleans, LA.** *Information:* <http://www.the-aps.org/chapters/gulf/index.htm>.

*March 28-30*

**Biophysical and Biomedical Adaptation and Bioinspired Engineering, California Institute of Technology, Pasadena, CA.** *Information:* <http://www.its.caltech.edu/~iupscit/>.

*March 29-30*

**New Directions in Exercise Physiology, Official satellite conference to the 35th Congress of Physiological Sciences, San Diego, CA.** *Information:* Internet: <http://www.exercisephysiology.elsevier.com>.

*March 29-31*

**The 10th International Proton Transport Conference, Cell and Developmental Physiology & Disease, San Diego, CA.** *Information:* Internet: <http://proton.berkeley.edu/>.

*March 31-April 5*

**35th Congress of the International Union of Physiological Sciences (IUPS), San Diego, CA.** *Information:* Internet: <http://www.iups2005.org>.

*May 9-12*

**16th Conference for the International Society of Arterial Chemoreception (ISAC), Sendai, JAPAN.** *Information:* Internet: <http://www.isac-web.org/files/sendai1.htm>.

*May 9-13*

**The Association Francaise contre les Myopathies Scientific Meeting, Nantes, France.** *Information:* Internet: <http://www.myology2005.com>.

*May 22-26*

**15th Humans in Space Symposium, organized by the International Academy of Astronautics, Graz, Austria.** *Information:* Internet: <http://www.uni-graz.at/space2005/>.

*May 31-June 4*

**International Symposium on Mechanisms of Vasodilatation, Antwerp, Belgium.** *Information:* Internet: <http://www.mechanisms-antwerp.be/>.

*June 18-23*

**19th American Peptide Symposium: Understanding Biology Using Peptides, San Diego, CA.** *Information:* <http://www.AmPepSoc.org>.

*June 27-30*

**14th International Scientific Congress CNIC 2005, 40 Years at the Service of Science and Technology, Havana, Cuba.** *Information:* Migdalia Luna Cisneros, Professional Congress Organizer, Havana International Conference Center, Apartado Postal 16046. Tel: (537) 285199 y 226011-19; Fax: 287996, 283470 y 238382; Email: [migdalia@palco.cu](mailto:migdalia@palco.cu); Internet: <http://www.complejopalco.com>.

*June-August*

FASEB Summer Research Conferences, Colorado, Georgia, Vermont, Arizona, and Italy. *Information:* FASEB Summer Research Conferences, 9650 Rockville Pike, Bethesda, MD 20814. Tel: 301-634-7010; fax: 301-634-7007. Internet: <http://src.faseb.org/>.

*June-August*

**Woods Hole Marine Biological Laboratory and Cold Spring Harbor Laboratory Course Fellowships, Woods Hole MA and Cold Spring Harbor, NY.** *Information:* <http://www.iac-usnc.org/MBLcoursefellowships.html>.

*July*

**4th Meeting of The Mammalian Myocardium, University of Leeds, United Kingdom.** *Information:* Internet: <http://www.leeds.ac.uk/mm2005/>.

*July 3-7*

**Connect 2005, The 12th RACI Convention, Sydney, Australia.** *Information:* <http://www.pco.com.au/connect2005/>.

*July 17-29*

46th Annual Short Course on Medical and Experimental Mammalian Genetics, Bar Harbor, ME. *Information:* Internet: <http://www.jax.org/courses/events/coursedetails.do?id=120>.

*July 24-27, 2005*

**2nd Annual Symposium of the American Heart Association Council on Basic Cardiovascular Sciences, Keystone, CO.** *Information:* <http://www.americanheart.org/presenter.jhtml?identifier=3026712>. Email: [scientificconference@heart.org](mailto:scientificconference@heart.org) Tel.: 214-706-1543.