



The Physiologist

Mentoring for Success in Physiology Bodil M. Schmidt Nielsen Award Presentation

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I am deeply honored to be a recipient of the Bodil Schmidt-Nielsen Distinguished Mentor and Scientist Award, an award named for such an outstanding physiologist and role model. Just last summer my husband and I brought our children to experience one of my favorite places, Acadia National Park on Mt. Desert Island off the coast of Maine. As we were hiking with one of my favorite mentors, Dr. David Dawson, presently Chair of the Department of Physiology and Pharmacology at Oregon Health and Science University, Dave was telling me what a wonderful woman Dr. Schmidt-Nielsen was and how we would have liked each other. I found this to be the ultimate compliment. Dr. Schmidt-Nielsen is the embodiment of my first rule of mentoring:

Mentor Rule 1. When serving as a mentor, it is not just the advice you give that is helpful. The example you set is equally important (see Table 1).

I spent a great deal of time trying to decide what to talk about today. I started by rereading some of my favorite mentoring books. However, I eventually came to the conclusion that there are a lot of people who are more qualified than I am to give a lecture on mentoring and that there are lots of good books and articles available on the topic. So I asked myself what unique perspective I could offer. I decided the only unique perspective I could offer was one based upon my own life and my own experiences. So what I plan to do is to tell you a little bit about my background, mention some of my more influential men-

tors, and tell you the lessons I learned from them (either directly or indirectly). I will then finish up with a few general thoughts about mentoring.

To give you some of my background: I grew up in a University town (Newark, DE). And yet there were only three or four girls in my high school class of over 300 who took calculus and only two or three who took physics. Despite my being one of the top students in my calculus class, the only math related profession my male calculus teacher suggested I should consider was teaching high school math. My well-meaning female guidance counselor suggested I not carry such a difficult course load and consider nursing school. However, I had terrific chemistry and physics teachers, both men, who were very supportive of my interests and skills in math and science. My physics teacher offered me a chance to do some research with him. My chemistry teacher made certain I received the most lucrative mathematics and science award at graduation. Their support, the support of some of my non-science female teachers, and the support of my parents were apparently sufficient to make me think I could succeed as a scientist because I never wavered in my desire to go to a rigorous school and become a scientist.

From this high school experience, I learned three important lessons related to mentoring (see Table 2):

Mentee Rule 1: A well intentioned mentor is not the same as a good mentor.

Mentee Rule 2: Not all advice is good

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The World Through a Different Window: An International Perspective on Research

Robert P. Grathwol,

Director, US Liaison Office, Alexander von Humboldt Foundation

[The essay is an adaptation of a presentation given at the San Diego meeting of the International Union of Physiological Science, April 1-5, 2005.]

The Nobel Prize winning economist James Buchanan advised his graduate students that, to be creative, they needed to “see the world through a different window.”

I apply Buchanan’s admonition through the prism of my personal experience. Long ago, as an American college graduate of modest means, I was fortunate to win a year of total immersion in a non-American culture and university life; I stayed for two years and returned with a degree from a French university. The experience, which shaped my research career and enormously enriched me personally, coupled with years of observation since, convinced me that a research stay abroad has value intellectually, educationally, and practically.

If Buchanan’s advice to see differently aims to stimulate creativity, then living and working in a foreign culture offers an incredible opportunity. Coping with a different culture challenges us to look at the world anew, to confront cultural filters daily that refract our perspective.

Just as creativity benefits, so does practicality. The networks forged abroad can serve for a lifetime, both professionally and personally. Learning how to work in another culture hones abilities increasingly necessary in a global marketplace for talent and labor. The Indians of Bangalore have learned this lesson so well that now our work is being outsourced to them rather than their talent coming to study with us. Look at Thomas L. Friedman’s recent book, *The World is Flat* (1).

The increasing competitiveness of research institutions beyond our borders is borne out by the academic ranking of 500 universities published in November 2004 by Shanghai Jiaotong University. Eight of the top 30 universities are non-American. In a similar list published on the other side of the globe by the London *Times* a few

weeks later, nine of the top 20 universities are outside the United States. Universities in Tokyo, Kyoto, Beijing, Singapore, Canberra, and Melbourne—all concentrated in Australasia—are near the top of one list or the other. Bill Gates chose to open an advanced Microsoft research facility in India in January 2005 because, he states flatly, India and China are producing more of the best engineering minds than the United States. It is Microsoft’s second overseas research laboratory in Asia; the first opened in Beijing in 1998.

Microsoft’s investment in Asia suggests a potential shift in the locus of excellence in research and education. An article in a recent *New York Times/International Herald Tribune* reported that China is “attracting a growing number of the brightest students, scholars, and professionals from southeast Asian countries” such as Thailand, Singapore, and Indonesia. Five years ago, before the attacks on the World Trade Center, 6,250 Indonesian students received visas to the United States. In 2003, the number was 1,333, a decline of 79%. By contrast, 2,563 Indonesians were admitted to Chinese universities that same year, an increase of 51% over 2002! Indonesia’s post-1945 leadership was dubbed “the Berkeley Mafia” because so many had degrees from the University of California-Berkeley. Will those educated in China dominate a 21st century generation of Asian leaders?

The United States has long profited from an infusion of non-American intellectual talent, but in the new global environment, the flow may be changing. In 2002, the United States had 586,000 foreign students enrolled in US universities—the largest foreign contingent in any one country. Great Britain ranked second, with 270,000, and Germany ranked third, with 227,000. Those numbers represented an increase for Britain of 15% and for Germany of 10%, but a **decline** of 6% for the United States. Our “brain gain” may be waning.

Like Asia, Europe is investing in the

internationalization of its research establishment. The European Union has mounted an aggressive effort (the Sixth Framework) to promote international experience in research and advanced study. The plan earmarks 17.5 billion Euros over five years to support programs that enhance the international exposure of European researchers. The European Community is also financing non-Europeans at European research installations. The European Community as a whole values the foreign research experience enough to put up money to expand access to it.

Indications are prevalent that in Asia and in Europe money and thought are being invested in providing advanced researchers with opportunities for international experience—and that researchers are responding. By contrast, nearly every statistical indicator shows that support for international education in the United States holds a very low priority and that, even when opportunities exist, American researchers are unaware or uninterested in them. Throughout the 1990s, US applications for Fulbright Senior Scholar awards, for National Science Foundation fellowships to Japan, and for Humboldt Foundation Research Fellowships showed a marked decline.

When college faculty were asked how many months during the past three years faculty members they had traveled abroad, 65 percent said none. About 80 percent of US faculty has never collaborated with a foreign scholar.

Student participation in the international world is no more prevalent. Less than one percent of American college students study abroad and the vast majority of those participate in programs that last as few as eight weeks.

Why this indifference? I suggest six propositions that account for the limited interest that Americans show towards a research experiences abroad:

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The Curse of our preeminence:

Why worry?

The level of our arrogance:

Why bother?

The Economy:

What about that job?

The allure of money:

Why settle for less?

A lack of awareness:

Go where?

Career path difficulties:

How do I balance all this?

Of these, our preeminence and our arrogance are the most troubling, and perhaps the least justified. It is true that for several decades the United States has enjoyed preeminence in research and higher education. The size alone of our educational establishment makes a case for our favored position—3,600 non-profit colleges and universities and another 3,000 similar proprietary schools. Our educational system has been open to applicants of widely varying social, economic, ethnic and national backgrounds, and prior educational attainment. This has been an attraction, as is the openness and flexibility of our professions and our economy. Our world political leadership has lent additional prestige, and the worldwide fascination since World War II with our popular culture has exerted a magnetism that has drawn many bright people here to learn and to pursue research and professional careers. Finally, the English language, especially the American idiom, dominates science and commerce, so that developing fluency confers a great advantage.

All of these factors are real, and they combine to promote smugness. That smugness contributes directly to our arrogance, and both attitudes dampen any inclination to put us out to go abroad. At a recent meeting I mentioned the Humboldt Foundation's eagerness for more qualified applicants from the United States. A senior scholar representing a university of renown responded, "When I advise my postdocs, I always tell them to go where the **best science** is." His meaning was clear—the best science was in his back yard, not abroad. In short, "Why worry? Why bother?"

The attitude expressed by this com-

ment will not encourage international experience nor cultivation of the skills needed in a global marketplace for talent and achievement. Mentors exercise a dominant influence on the careers of PhD researchers; as the world changes, they may have to worry, they may have to bother, to help their young researchers either keep up or catch up.

While attitudes are malleable, other factors are beyond our control. That is true of the economy and possibly of two career families. Partners may face dilemmas such that no opportunity for one can counterbalance the potential loss of opportunity or income for the other.

The allure of money means weighing short-term and long-term advantage. An overseas stipend may be less than a postdoctoral salary in the United States, but the long-term benefits may more than compensate for the short-term monetary discrepancy. Mentors can emphasize that a professional stint abroad may have long-term value and be worth some short-term sacrifice. Senior researchers can help alleviate fear that someone overseas is locked out of jobs, perhaps by arranging temporary positions for young researchers returning from abroad so that they can reintegrate into the domestic networks that will lead them to their next position. Help may be as modest as finding financing for a ticket to a conference or a job interview in the United States.

The lack of awareness of the opportunities for finding financial support for research sojourns abroad is alleviated by invitations such as I received to write this article and by the session at the meeting in San Diego to present these ideas.

For its part, the Alexander von Humboldt Foundation has a long-standing commitment to international collaboration in research. Over the past 50 years, the Foundation has disbursed about 1 billion Euros to support 23,000 non-German scholars (and their families) during extended research stays in Germany. As a result, it has a network of highly accomplished individuals from more than 130 countries around the globe. Four Humboldt research grant programs are particularly relevant.

The **Humboldt Research Fellowship** brings to Germany active, publishing, non-German researchers of any nationality, in any field of research, who hold a PhD and who are under 40 (http://www.humboldt-foundation.de/en/programme/stip_aus/stp.htm).

The **Feodor Lynen Research Fellowship** sends German PhD holders under 38 years old to work with a former Humboldt-grantee at his/her home institution. (http://www.humboldt-foundation.de/en/programme/stip_deu/flf.htm).

The **Humboldt TransCoop Award** (Transatlantic Cooperation in Research) has no age limit but still requires a PhD. Aimed more at the social sciences, humanities, law, and economics than at natural sciences, TransCoop grants provide seed money for new collaborations between a German scholar and a North American scholar (US or Canadian). (http://www.humboldt-foundation.de/en/programme/stip_aus/transcoop.htm).

The **Humboldt Research Award** acknowledges and rewards a candidate's internationally recognized lifetime of broad and distinguished achievement and contributions to research. All nationalities and all fields are eligible but nominations must come to the Humboldt Foundation from eminent German scholars; no direct applications are accepted. (<http://www.humboldt-foundation.de/en/programme/preise/pt.htm> and http://www.humboldt-foundation.de/en/programme/preise/bessel_d_01_01.htm).

The Humboldt Foundation has also tried to address the tenure track dilemma that makes young researchers reluctant to venture abroad. It has instituted shorter-term stays (minimum three months in three successive years) for applicants from the United States for its Humboldt Research Fellowship. This may help overcome the objection that research abroad precludes spending substantial time "at home" to develop a lab and a research team or to keeping the tenure process on schedule precludes research abroad. The Foundation also recognizes that career paths for women differ from those of men and, therefore, allows some lee-

way on the age limit for the Humboldt Research Fellowship if a woman's career path has been influenced by child bearing and child rearing.

These opportunities are specific to the Humboldt Foundation and to Germany. Many other opportunities exist—Fulbright, NSF, Marie Curie fellowships. The catch is finding the information and having mentors willing to promote the possibilities. Those of you who are Humboldtians—who number about 4,500 in the United States—can help by acknowledging the Foundation's support whenever you make a professional presentation. (We can send you a Power Point slide

or transparency to use.) You can put us in touch with *your* professional journals and newsletters, especially the latter, where we might place announcements about the Humboldt grants. You can relay your own experience to younger colleagues and encourage them to look into the Foundation's programs (<http://www.humboldt-foundation.de>).

Finally, we can all foster a more positive attitude about research abroad if we rephrase the remark about "going where the best science is." Perhaps we can incorporate James Buchanan's proposition by saying: "When advising my students and postdocs, I tell them

to explore a research stay abroad, because that may give them their best opportunity to look at the world through a different window." ❖

References

Friedman. *The World is Flat: A Brief History of the Twenty-First Century*. New York: Farrar, Straus and Giroux. 2005.

Dr. Grathwol may be reached at avh@verizon.net

American Physiological Society

Bodil M. Schmidt-Nielsen Distinguished Mentor and Scientist Award

The Bodil M. Schmidt-Nielsen Distinguished Mentor and Scientist Award honors a member (male or female) of the American Physiological Society who is judged to have demonstrated dedication and commitment to excellence in training of young physiologists whether by mentoring, guiding and nurturing their professional and personal development, developing novel education methods/materials, promoting scientific outreach efforts, attracting individuals to the field of physiology, or by otherwise fostering an environment exceptionally conducive to education in physiology and made outstanding contributions to physiological research.

The award was established to recognize Dr. Bodil M. Schmidt-Nielsen, the first woman President of the Society and a distinguished physiologist who has made significant contributions in her field. The award of \$1,000 and a commemorative plaque

will be presented at the annual Experimental Biology meeting where the awardee will meet with APS members and young scientists. The first award was made at EB 2004 in Washington, DC.

Nominations can be submitted to the Women in Physiology Committee by any member of the American Physiological Society. The nomination should include the following:

a letter stating the basis for nomination with a synopsis of the nominee's scientific contributions and mentoring skills and evidence related to the criteria, such as:

assisting students with research funding or job placement, success of graduates, publications and presentations of graduate students, participation in graduate education activities, successful role model, teaching awards, descriptions of innovative teaching

methods, etc.

a list of current and former trainees and their current positions and any award they received;

at least two and up to five additional support letters.

nominee's current curriculum vitae.

The nomination packet should be submitted by either a nominator(s) or by a nominator and the nominee.

Applications can be sent to the following address: Bodil Schmidt-Nielsen Distinguished Mentor and Scientist Award; American Physiological Society; Education Office; 9650 Rockville Pike; Bethesda, MD 20814-3991.

Applications are due by **September 15**. (NOTE NEW DEADLINE).

For questions, please contact the APS Education Office at 301-634-7132 or education@the-aps.org. ❖

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advice.

Mentee Rule 3: Use common sense when assessing advice.

This trend of having classes with very few females, few if any female math or science professors, but supportive male mentors, continued throughout my education. My first real mentor was Dr. Ettore Infante, Associate Professor of Applied Mathematics at Brown University, who later became Dean of the College of Arts and Sciences at Vanderbilt University and is now retired. Dr. Infante took me under his wing during freshman week of college, mapped out a potential program, advised me on classes throughout college, introduced me to another faculty member who shared my interest in combining mathematics with biology, helped me get a National Science Foundation Undergraduate Research Fellowship, and helped get my individualized major officially adopted as a *bonafide* University major shortly before I graduated. I graduated as the first person from Brown University with a major in Applied Mathematics-Biomedical Sciences, with a program very similar to the one we mapped out together during that first week of college. This leads me to the next rule of mentoring.

Mentee Rule 4. If you find someone helpful, adopt him or her as a mentor.

I, of course, had an officially assigned advisor, but I never used him. He was nice but did not know enough about me or my interests to be



Christin Carter-Su, the 2005 Bodil M. Schmidt-Nielsen Distinguished Mentor and Scientist Awardee, with Linda Samuelson from the University of Michigan, the colleague who nominated Carter-Su.

helpful. This leads me to the corollary of my previous rule of mentoring:

Mentee Rule 5. If someone is not helpful, then look elsewhere.

This is true for advisors, true for teaching assistants in courses, and true for mentors. I also learned the impact mentoring can have. So for the mentors in the audience, what you are doing is worthwhile.

Mentor Rule 2. Your mentoring can have a tremendous impact on someone else's life.

My second real mentor was Dr. H. Thomas Banks, then Assistant Professor of Applied Mathematics, who is currently Director of the Center for Research in Scientific Computation at North Carolina State University. He was the person to whom Dr. Infante recommended me for an undergraduate research project com-

binning biology with mathematics. Tom was a terrific mentor who treated me as an equal and taught me many things that I continue to share with my students and fellows:

Mentee Rule 6. Find a passion and go for it. When you do research, most of the time things do not work which leads me to *Mentee Rule 7. Make certain that the high you get during the 5% of the time that your research "works" is so high that it can carry you through the other 95% of the time when things do not work.*

Mentee Rule 8. You can never predict the job market. So do not pick a profession just so you can get a job at the end of your training. Pick something

that you love to do. That way, whether or not there are jobs in your major at the time you graduate, you will have at least loved what you have done for the past years you spent doing it.

Mentee Rule 9. Never take a seminal job in California. Do not do a postdoctoral fellowship or take a new faculty job in California. There are too many distractions at a critical stage of your life!

I also learned that as a mentor, you should share your passion for your job with your students and fellows. Your passion is probably more inspiring than any advice you give (*Mentor Rule 3*).

Mentor Rule 4. Share your life story: your past, current life and future goals. Let your mentee know of difficult decisions you had to make, obstacles you had to overcome, and insecurities you had at the start of your career, and may still have. Share your current life and share some of your future goals. This lets your mentee know that they do not have to be perfect and things do not have to always go smoothly for them to succeed in science.

Graduate school followed the same pattern as high school and college. I joined the Radiation Biology and Biophysics Department at the University of Rochester—you can imagine what the ratio of men to women was in that department back in 1972! I think the numbers in my entering class were three women and

Table 1. Mentoring rules for the mentor.

When serving as a mentor, it is not just the advice you give that is helpful. The example you set is equally important.

Your mentoring can have a tremendous impact on someone else's life.

Share your passion for your job with your students and fellows. Your passion is probably more inspiring than any advice you give.

Share your life story: your past, current life and future goals.

- Science should be fun.
- Keep a sense of humor.
- There are times when it is okay to ask your mentee to just "trust me."
- Share your knowledge.
- Listen carefully.
- Be proactive.
- Be honest.
- Be diplomatic.
- Show you care.
- Help make connections.
- Be an advocate.

around 24 men. Again, most, if not all, of my classes were taught by men. However, I had a great thesis advisor. Dr. George Kimmich introduced me to Na⁺-dependent glucose and amino acid transport and thus to physiology. He just retired this past year and I had dinner with him and his wife this past week during my daughter's grand college visit tour.

Again, I learned many mentoring lessons from George:

Mentee Rule 10. Science should be fun. We all entered the field of science presumably because we love it. It is easy to lose sight of that fact under the pressures to succeed in the world of science. But science can and should still be fun. If it stops being fun for you, consider changing labs, projects, or even your career. It is not that difficult to find another "not fun" career that is less stressful and pays more.

And for mentors, it is much easier for your mentees to remember that science should be fun if you remember that *Science should be fun* (Mentor Rule 5).

Mentee Rule 11. Keep a sense of humor. It is always good not to take yourself too seriously, and to keep a sense of humor about failed experiments and negative things that happen to you or your colleagues. In my laboratory, we used to have a display of cracked and otherwise failed electrophoretic gels. The more artistic the resulting design, the more highly the gel was valued. This rule to *Keep a sense of humor* (Mentor Rule 6) also applies to mentors.

Mentee Rule 12. Stay true to yourself. You can be a wonderfully decent, kind and caring person and still succeed in science. As I tell my students, the very rich and famous rarely achieve fortune and fame by being warm and fuzzy towards their students, fellows and colleagues. Unfortunately, we all know "highly successful" scientists who exhibit an extreme level of self-centeredness and behavior that to some of us borders on the unethical. But that does not mean that you have to lower yourself to their level. There are many terrific scientists who are also terrific people. George helped teach me that you can be a wonderfully decent, kind and caring person and still succeed in science

Mentee Rule 13. When writing a manuscript, tell a good story. There is no need to have chronologic accuracy. I can still remember the amazement I had when I read one particular manuscript George wrote. I remembered in what order the experiments were carried out and the thought processes that went into their design, and they bore no resemblance to how George presented them in the manuscript! But the manuscript told a wonderful, easy to follow, very logical story, things that are much more important than chronologic accuracy.

Mentee Rule 14. "Trust me." There are times when you have to just trust your advisor. The corollary to this is Rule 7 for mentors which states that there are also times when it is okay to ask your mentee to just "trust me". After all, you are the mentor and presumably bring to the relationship many years of accumulated knowledge and experience. In my case, the occasion arose when I needed to change my thesis project in my fourth year of

graduate school and George and I could not agree on what to change it to. Eventually, George played the trump card: "Just trust me. You will come to love this project"—and he was right.

Mentee Rule 15. Keep in touch with your mentors even after you leave their institution and keep them informed of your accomplishments. Your mentors most likely invested quite a bit of themselves in you and usually enjoy hearing how you are doing. It can also be very useful for you as well. I got two of my first faculty offers because of George. A past graduate student of mine got her two jobs in part because of people I knew. Past mentors can also be in a position to recommend you for study sections, editorial boards and so forth.

My postdoctoral mentor, Dr. Michael Czech, currently Professor and Chair, Program in Molecular Medicine, University of Massachusetts Medical School, taught me an enormous
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Table 2. Mentoring rules for the mentee.

Not all advice is good advice.	Sell your research.
A well-intentioned mentor is not the same as a good mentor.	Think outside the box.
Use common sense when assessing advice.	Go where the science leads you.
If you find someone helpful, adopt him or her as a mentor.	Schmooze.
If someone is not helpful, look elsewhere.	Act like an accomplished scientist.
Find a passion and go for it.	Hire well and bring out the best in the people you hire.
Make certain that the high you get during the 5% of the time that it works is so high that it can carry you through the other 95% of the time when things do not work.	Accentuate the positive.
You can never predict the job market.	One can never have too many mentors.
Never take a seminal job in California.	Choose your committees and battles carefully.
Science should be fun.	Never say "yes" to anything when first asked.
Keep a sense of humor.	Your sanity counts for something.
Stay true to yourself. You can be a wonderfully decent, kind and caring person and still succeed in science.	Everyone has something to offer.
When writing a manuscript, tell a good story. There is no need to have chronologic accuracy.	Age is not a prerequisite to being a good mentor.
There are times when you have to just trust your mentor.	Seek out help.
Keep in touch with your mentors.	Do not wait until the last minute to ask for help.
Understand the politics.	Nurture relationships.
	Do not take mentor's advice personally or get defensive.
	Be discrete.
	Do not undermine your mentor.
	Return the favor—help your mentor whenever appropriate and mentor others.

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amount, particularly about scientific politics. And do not kid yourself – politics is as important in this job as in any other. Things that I learned from Mike include the following:

Mentee Rule 16. Understand the politics of your department. Understand the politics of your University. Understand the politics of your field. Understand the politics of your Professional Society.

Mentee Rule 17. Sell your research. Make your presentations and grant applications interesting and exciting. The first time I heard Mike present some of my research at a national meeting, it sounded so good that it took me awhile to figure out it was actually my data that he was talking about.

I learned to *think outside the box* (Mentee Rule 18) and never hesitate to apply new techniques to my work. Never become married to any one technique. *Go where the science leads you* (Mentee Rule 19). Arguably my laboratory's greatest contribution to

science thus far is showing that growth hormone binding to its membrane receptor activates the receptor-associated tyrosine kinase JAK2. The concept that growth hormone and other ligands that bind to cytokine receptors might function by activating a receptor tyrosine kinase or receptor associated tyrosine kinase was such a novel, unpopular concept that people either ignored our work or panned it for almost seven years. Our data went against current dogma. However, we kept following the science and it turned out that we were right and the pay-off has been enormous.

I learned that you have to *schmooze* (Mentee Rule 20), whether you enjoy schmoozing or not. People need to know your work. People are more likely to fund you and give you the benefit of the doubt, recommend you for committees and study sections, and write a positive job recommendation or promotion letter if they can put a face to a name, and if they like you and respect your work. You need to let people know you are a player. You have to

talk to people on the phone. You need to attend national and international meetings and ask questions to let people know who you are. You need to join other scientists for meals and other activities, no matter how much it costs or how tired you are, or how much you would rather be doing something else. I have made some of my best connections by inviting people to dinner and/or persuading others to join me site-seeing. If you are a postdoctoral fellow or a new faculty member and are intimidated by the senior people in the field, then start practicing schmoozing with people at your stage of career. After all, they will eventually grow up to be the important senior people in the field.

I learned that to become an equal in the eyes of the scientific world, you have to *act like an accomplished scientist* (Mentee Rule 21), equal to the most important people in your field. You have to dress the part of an accomplished scientist if you want to be taken seriously. You want your colleagues to think of you as a colleague, not as a student. You have to carry yourself as if you are an accomplished scientist. You need to talk to other scientists as if they are interested in what you have to say. For me, the hurdles included such things as becoming comfortable calling faculty by their first names, taking the initiative to talk to famous people about their science, and not letting the fact that my senior colleagues had total control over my life and future make me feel inferior or subservient.

I learned that the way to make a lab successful is to *hire well and bring out the best in the people you hire* (Mentee Rule 22). When you are a student, you most likely are doing all or most of the experiments yourself. But when you become head of a laboratory, you will no longer have the time to do the experiments yourself. You will have to hire people to do them for you. Thus, your success or failure will depend substantially on your ability to supervise and motivate your students, fellows and employees.

I learned to *accentuate the positive* (Mentee Rule 23). As the leader of your laboratory, you need to find the positive in every experiment. I take pride in hearing that when people in my lab

Table 3. Things with which mentors can help you:

Graduate students:

- How to choose a lab and an advisor
- How to do research
- How to write a research paper
- How to make a strong oral presentation
- How to know when to drop a project
- How to think outside the box
- How to read the literature, synthesize it and critique it
- How to write a grant
- How to find a good postdoctoral fellowship
- How to start to become independent
- How to network

Postdoctoral fellow:

- How to write a research paper
- How to choose a project
- How to decide when to change projects
- How to make a strong oral presentation
- How to think outside the box
- How to read the literature, synthesize it and critique it
- How to write a paper

- How to write a grant
- How to become independent
- How to network
- How to teach
- How to supervise
- What job should I look for
- How to apply for a job
- How to interview for a job
- How to negotiate the job offer

Faculty:

- How to write a grant
- How to teach, write and grade exams
- How to interact with office support staff
- How to interact with colleagues
- How to hire good people and make them productive
- How to decide which committees to serve on
- How to get anything done
- How to network
- How to get invited to give talks
- How to be taken seriously as a scientist
- How to successfully mix family and work
- How to do it all

get discouraging results, others in the lab tell them to come see me because I will find something good about their experiment. Mike also taught me to think twice about answering the question "How's it going?" truthfully. When I first started my own laboratory, things were going much slower than I would have liked. It was very discouraging. It was particularly discouraging because whenever I asked Mike about how things were going in his laboratory, he would always say it was going terrifically. So I figured he was doing great and I was doing terribly. It was very depressing. However, I eventually talked to people in his laboratory and they had all kinds of horror stories. So I learned from that that if you want the world to think of you as a successful scientist, it is much better to dwell on all the positive things going on and keep the problems to yourself and your best friend, or maybe a very trusted mentor. Along the same lines, my first grant proposal came back with quite a few criticisms. These criticisms sounded very familiar to me. I quickly figured out that they sounded very familiar because they were exactly the same criticisms that I had put into my grant proposal (you know the part—what potential problems might arise). Never again did I provide my reviewers with the exact sentences they needed to criticize my grant proposal. I now write all my potential problems in subordinate clauses, saving the dominant clauses for why the potential problem is not really a problem. My priority scores have gone way up. At the very least, the reviewers are forced to find their own criticisms of my grant, or if they choose to cite one of the problems I brought up, at least I have supplied the exact words for another member of the study section to argue why that particular problem

is not really a problem.

Although I received a great deal of mentoring during my years of training, I had not really thought of it as mentoring at the time. It was really as a faculty member that mentoring became a big part of my life. This is when I learned that having women colleagues was vital to my success and sanity. This is when I figured out that I needed a lot of help to be able to succeed as an academician: setting up my lab, getting grants, putting together and supervising a research team and getting tenure. I needed help with all those forms, committee decisions, teaching, grant writing, time management, etc etc. Luckily, the University of Michigan was a very supportive institution with lots of people willing to help. This is when I learned *Mentee Rule 24* that:

One can never have too many mentors. Not everyone is good at everything. Individuals are unlikely to have all of the knowledge you need. You need a mentor who understands the politics of specific committees, your department and your institution. You need a mentor who understands your science. You need a mentor who is good at teaching, if that is one of your responsibilities. You need a mentor who is active in your professional society. You need a mentor who has a similar living situation and viewpoint: for instance, women need a woman mentor, men and women with children need mentors who have families, and minorities need minority mentors. You need someone for reality testing. You need someone who can help you see all the issues relevant to the problem at hand (for these and other examples, see Table 3).

Let me give you some examples: I can help a woman colleague help decipher whether a comment from a colleague is sexist or not. I am less able to determine whether a subtle comment is racist. You need someone who will take your grant and tear it to shreds. But you also need someone who can tell you how to fix it. This goes for the science as well as the writing. You need someone who will share his/her animal use, radioactivity, human use, chemical safety forms with you. You need someone to help you solve personnel problems. You need someone to

help you determine which committees to serve on, how to choose the people to recommend for your tenure letters, what you can say "no" to and how to tell your chair "no" when he or she wants you to take on some time-consuming or controversial job. You need someone to help you figure out how to deal with a colleague who you think is undermining you, stealing your ideas, and/or not citing your work. You need someone to help you figure out how to get invited to give seminars, and be appointed to editorial boards and grant review committees.

Among my many mentors in the Department of Molecular and Integrative Physiology at the University of Michigan, several stand out. Dr. Jack Kostyo was the chair who hired me. From Jack I learned that it was okay to say "no." Dr. Arthur Vander helped me with my teaching. Dr. David Dawson helped me deal with sticky situations with colleagues. My current chair, Dr. John Williams, has been most generous in helping me understand Medical School politics and skills needed to be an administrator. Dr. Jessica Schwartz tears apart my grants and papers and makes suggestions on how to make them better, helps with letter writing, and serves as a general sounding board. I have had many other mentors both inside and outside my department, including a number of terrific women, who have greatly contributed to my success as an academician and made my life so much better at Michigan. Among these, I would like to mention one person in particular who has been a strong mentor in my life, Dr. Anita Payne, currently Professor Emeritus, and share with you just a few of the important things she taught me about mentoring.

Mentee Rule 25. Choose your committees and battles carefully. Not all committees are worth serving on and not all battles are worth fighting.

Mentee Rule 26. Never say "yes" to anything when first asked. Always take time to think about the request and preferably run it by someone more experienced. Is this a good committee or editorial board to be on? Will it help your career or will it prevent you from saying "yes" to something more impor-

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Table 4. Advice for women (and men) with children:

- Choose your mate carefully.
- Get lots of outside household help.
- Build a strong support network.
- Form friendships with other working families.
- Forget about domestic perfection.
- Delegate.

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tant down the road? Will it take away too much time from doing those things that will help you get tenure? If you decide to say “no”, figure out a graceful way to turn that particular request down.

Mentee Rule 27. Your sanity counts for something. Most likely, and particularly if you are perceived as being good and conscientious, you will not be able to do everything you are asked to do. You probably cannot even do all of those things you would like to do or feel you need to do, particularly if you have children. There will be times when it is okay to turn something down because to say “yes” to the request would put an unbearable strain on your time and threaten your physical or mental health or that of your family. It will probably not be the only time you are asked. If you really want to serve on that committee or what have you, you will probably have another opportunity to do so in the future when things are less hectic - perhaps after your children have grown, you have acquired a good lab manager to help run your laboratory, or you have completed your time as course director.

Being a successful woman with a husband and two children, I probably get asked most for advice about balancing work and family. This is the advice I give women (see Table 4), but most of it applies to men as well as women:

Family gives women happiness; Work gives women self-esteem. For this reason, it is important to keep a balance in your life. You should not feel guilty for working and you should not feel guilty for having a family and wanting to spend some quality time with them. But there are ways that you can make your life easier.

Choose your mate carefully. It is difficult and time-consuming to work full-time and have a family. It is virtually impossible if you are expected to work full-time and handle all the traditional female roles of wife, housekeeper, care-giver and cook. It is best to find a mate who values your job equally with his/hers and will share willingly and equally in household responsibilities.

Get lots of outside household help. If

both you and your spouse are working, you need to think of it as 1 and 1/2 incomes, not as two. You need to plan on spending at least 1/2 of an income on help. Hire someone to clean your house for you. Hire the best daycare provider possible, preferably someone who will come to your house and will also do the laundry and other household chores. Hire someone to mow the grass. In essence, hire someone to do those jobs that you do not like doing so that you will have time to do the things that you do want or need to do, such as spend quality time with your children and spouse or write up another paper for publication.

Build a strong support network. If like me, you do not have family in the area who can help when emergencies arise, you need to build a strong sup-

port network. When my children were young, my husband would ask every teenage girl he saw in our neighborhood whether she babysat. We made arrangements ahead of time with other friends and neighbors who had childcare to cross cover for each other if our childcare fell through. We paid for our children to attend before and after-school programs even when we had after-school childcare at home just so we could send our kids to those programs on those days we did need it, such as when I had to give an 8 am lecture, the childcare giver called in sick, or the teachers were having one of their many in-service training or reporting days. We got the phone numbers of our friends' current and former caregivers, graduate and undergraduate students who were willing to babysit in a pinch, preschool student helpers, anyone who might be able to take care of our children on snow days, when our children were sick, or when our caregiver was unable to come for whatever reason.

“You should not feel guilty for working and you should not feel guilty for having a family and wanting to spend some quality time with them.”

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Form friendships with other working families. And as a corollary, try not to live in a neighborhood or send your child to a preschool where all the other

families have a stay-at-home parent. Our daughters went to a preschool where a requirement was that both parents had to have at least a half time job. Until they were five and went to public kindergarten, our children did not realize there was such a thing as a stay-at-home mom. Our children's preschool did not ask you to contribute food and help serve a Thanksgiving dinner—they prepared it and served it to you! Other working families can provide valuable information and emotional support. This is true for both men and women. It was one of my husband's male colleagues who helped persuade us of the benefits of having at-home care for our newborn. Other working families can tell you how and where to find good help, the best preschools and summer

campus for working families, how to cope with having one spouse out of town, where to buy the best “home-cooked” food to bring to school events, which sports teams have the best coaches and more importantly, the most convenient practice times, locations and car pools.

Forget about domestic perfection. There are times in your life when it is impractical to have the perfect house, the kind of house many of us grew up in. You need to make priorities. My husband's and my priorities are to spend time with our children and each other rather than to spend time straightening the house, cooking gourmet meals or having a Sunset magazine garden. For quite a few years, we entertained at home only those friends we knew well enough to have over without straightening up the house.

Delegate. Learn how to delegate. This goes for the home as well as work. There was one year when it became obvious that I was not going to be able to get my grant application out doing it primarily by myself as I had usually done or even by getting help from just those people in my laboratory whose work was funded by that

grant. In desperation, I announced to the laboratory that I needed everyone to stop working on his/her experiments and help with the grant. I had people looking up techniques, proof reading, shortening the text, checking references, working on figures, and buying food for everyone working on the grant. What was enlightening to me was finding out afterwards that no one really minded helping, despite some very long days and nights. Some in fact told me they really enjoyed it because it made them feel an important and integral part of the laboratory. They learned a lot about the science going on in the entire laboratory, and about what it takes to put together a grant application. I have never looked back!

My final advice for mentees includes the following:

Mentee Rule 28. Everyone has something to offer. I find every one of my colleagues has something useful to teach me. And in every case where I have reached out for help, they have freely offered their advice. Asking for advice is also a great way to get to know your colleagues better and vice-versa.

Mentee Rule 29. Choose your primary mentors carefully. Some people make better mentors than others. When you are new to a situation, there is some utility in keeping a low profile for a while and watching carefully how others interact with you and with each other. Pay attention to whose comments seem most insightful and whose comments others pay the most attention to. Pick that person as a mentor.

Mentee Rule 30. Seek out help. There are many things you will need help with during your career. Be proactive and seek out the help you need. Do not wait for your mentor to come to you. Your mentor may be happy to help, but may not realize that you need help or may be busy with other things and just not think about coming to you. As I tell people who seek me out, the squeaky wheel definitely gets the grease. And I suspect that this is true for many mentors.

Mentee Rule 31. Do not wait until the last minute to ask for help. I cannot do a very good job helping you if you wait until the last minute. I also resent it, particularly if it is a recurring theme.

Mentee Rule 32. Nurture relationships.

Mentee Rule 33. Do not take your

mentor's advice personally or get defensive. The greatest gift a mentor can give you is the truth. It is not valuable to have someone read your grant cursorily and say, "It's great". You need someone who will spend the time to go over it and point out the rough spots both scientifically and communication wise. I have a couple of people who do that for me. I have to admit that I am not always a happy camper when I first get back the comments – how could they not understand what I wrote? They must have been tired when they read it! But after I calm down, I realize that if someone had a problem with a particular part of my grant proposal, even if I do not agree with his/her suggested revisions, that part needs rethinking and rewriting.

If your friend has trouble understanding your paper or proposal, just think about the reviewer of the paper or proposal who is not your friend, may not be directly in your area of research, is probably reading the paper or proposal late at night after a hard day's work, and has no vested interest in taking the time to understand your work or figure out its importance.

Mentee Rule 34. Be discrete. Mentoring works best when the mentor can share his/her personal thoughts and experiences about situations and other people. Never, ever, breach that trust. If you do, you will never receive honest advice again.

Mentee Rule 35. Do not undermine your mentor. Again, this is an issue of
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Christin Carter-Su Receives Second Bodil M. Schmidt-Nielsen Distinguished Mentor and Scientist Award

The Bodil M. Schmidt-Nielsen Distinguished Mentor and Scientist Award honors a member (male or female) of the American Physiological Society who is judged to have demonstrated dedication and commitment to excellence in training of young physiologists whether by mentoring, guiding and nurturing their professional and personal development, developing novel education methods/materials, promoting scientific outreach efforts, attracting individuals to the field of physiology, or by otherwise fostering an environment exceptionally conducive to education in physiology and made outstanding contributions to physiological research.

The award was established to recognize Dr. Bodil M. Schmidt-Nielsen, the first woman President of the Society and a distinguished physiologist who has made significant contributions in her field.

The APS Women in Physiology Committee, chaired by Siribhinya Benyajati, University of Oklahoma Health Sciences Center, selected Dr. Christin Carter-Su, University of Michigan, from a large pool of candidates. Dr. Carter-Su was

chosen based both on her outstanding record of mentoring and research. She was nominated by her colleague, Linda Samuelson from the University of Michigan.

The award of \$1,000 plus travel expenses and a commemorative plaque were presented to Dr. Carter-Su by Dr. Benyajati and APS President D. Neil Granger at a special luncheon honoring her during the IUPS/EB 2005 meeting in San Diego, CA. During the luncheon, Dr. Carter-Su spoke on "Mentoring for Success" to the attendees, which included current and former students of Dr. Carter-Su as well as some of her own mentors. ❖



Siribhinya Benyajati, chair of the APS Women in Physiology Committee, greets Christin Carter-Su, the 2005 Schmidt-Nielsen Awardee.

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trust. Do not put down your mentor to anyone privately or publicly. Similarly, when your mentor recommends you for some task, for example, a committee of your professional society, do your best job at that task. Your mentor put his/her reputation on the line for you and it is up to you to prove that his/her trust is warranted. Besides, doing a good job will open the door to other more powerful jobs.

Mentee Rule 36. Return the favor - help your mentor whenever appropriate and mentor others. Generally, mentors mentor out of the goodness of their hearts—to help you succeed in a challenging job. There are three good ways to repay them. The first and foremost is to follow their advice and succeed. But there are two other ways to return the favor. Support your mentor's career in some tangible way, such as recommending them for an appropriate award. Equally important, pass on the legacy and mentor others.

Final advice for mentors:

Mentor Rule 8. Share your knowledge: You have more knowledge about science and the scientific life than you know. Put yourself in the other person's shoes. Remember what things you found difficult or even scary. What things did people do for you that were helpful? What things would it have been nice to have someone help you with? For me, one of my most traumatic experiences as a new faculty member was my first lecture to a large dental school class. Everything that could go wrong did go wrong, including handouts delaying the start of class because I had no concept of the time needed to copy 300 20-page handouts or that 300 20-page handouts were too heavy to hand carry; not knowing how to use the microphone and having no one there to help; not knowing how to hold and use my lecture notes, slide changer, chalk, and pointer all at the same time—you get the picture. Because of this, I made a point of sharing my experience with all subsequent new faculty teaching in the course and personally took them to the lecture hall ahead of time to make certain they knew how to use all of the equipment.

Mentor Rule 9. Listen carefully. Every mentee has different needs and comes to the relationship from different starting points. Your goal is to

make certain that a particular mentee succeeds and that means that you need to tailor your advice to that particular mentee.

Mentor Rule 10. Be proactive. Oftentimes your mentee will not be aware of everything they need help with. Be proactive and mentor him/her on things before they ask. Do not wait until it is too late. For example, make certain they know from day one what is expected of them to get tenure in the department. Do not wait until the year they come up for tenure to tell them.

Mentor Rule 11. Be honest. Tell the truth as you see it, but be diplomatic (*Mentor Rule 12*). It is better for you to tell your mentee the truth about some weakness while there is still time for them to do something about it than it is to have your mentee find out their weakness the hard way, such as by their grant application not getting funded, their promotion getting turned down, or becoming unemployed because they turned down a pretty good job offer due to an unrealistic expectation of getting a better one.

Mentor Rule 13. Show you care. Science can be a daunting profession, especially at the graduate school level or higher. It is extremely helpful to mentees to know that at least one person in their chosen career is looking out for them and cares whether they succeed.

Mentor Rule 14. Help make connections. If possible and appropriate, recommend your mentee for things that will promote their career, such as powerful committees, awards, seminars, and so forth. Introduce them to powerful people in their field.

Mentor Rule 15. Be an advocate. View your job as helping your mentee look their very best. If possible, save your criticisms for the mentee. If it is not possible, try to put a positive spin on a negative comment. If you feel you cannot be an advocate, consider finding another mentor for your mentee.

In summary, the mentor-mentee relationship can be a very special one. It is a chance for the mentee to learn how to succeed in a very demanding field filled with overachievers. For the mentor, it is a chance to pass on years of accumulated knowledge about how to succeed and take pleasure in helping the younger generation. For women and minority mentors of

women and minorities, respectively, mentoring can be a particularly effective way to increase the number of like minded colleagues, taking the pressure off of you to be the perceived representative of your sex or racial group. The keys to success are many. Overall, however, it is important for the mentee to keep asking for the help he or she needs and the mentor to keep anticipating and providing the help he or she would have liked to have had; for the mentee to use common sense in assessing the advice and the mentor in giving the advice, and for both of the mentee and mentor to always keep their eye on the long term goal of having the mentee succeed in science. I would like to close this talk with the following thought for both mentor and mentee to keep in mind as they pursue this challenging and often stressful career. This life we have chosen may be stressful, but it is never boring. What a gift we have been given to be paid, usually by the public, to pursue our passion and contribute to the world's knowledge. ❖

Selected References on mentoring and communication

Adviser, Teacher, Role Model, Friend. On Being a Mentor to Students in Science and Engineering, National Academy of Sciences, National Academy of Engineering, Institute of Medicine. National Academy Press, Washington DC 1997 (<http://www.nap.edu/readingroom/books/mentor/>)

At the Helm. A Laboratory Navigator by Kathy Barker, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY 2002

Hardball for Women. Winning at the Game of Business. Pat Heim with Susan K. Golant, Penguin Books, NY, NY 1992

You Just Don't Understand by Deborah Tannen, Perennial Currents, 2001

Different Societies have different publications and websites on mentoring including a helpful one from APS (<http://www.the-aps.org/careers/careers1/mentor/index.htm>)

How to Get a Job in Cell Biology, available from the American Society of Cell Biology National Office

Time: 5:45 PM, Monday, April 4, 2005
Place: San Diego, CA

I. Call to Order

The meeting was called to order at 5:50 PM by **President D. Neil Granger**, who welcomed the members to the 158th Business Meeting of the American Physiological Society. A booklet containing the agenda and a listing of all the APS award recipients was distributed.

II. Election of Officers

Executive Director **Martin Frank** announced the results of the election of officers that was conducted with an online ballot. The membership elected **Dale J. Benos**, University of Alabama at Birmingham, AL, as President-Elect (April 6, 2005–April 5, 2006). The three newly elected Councillors for three-year terms are **Susan M. Barman**, Michigan State University, **Irving G. Joshua**, University of Louisville, and **Gary C. Sieck**, Mayo Clinic College of Medicine (April 6, 2005–April 9, 2008). They will assume office at the close of the Annual Meeting. They are replacing **Virginia Miller** and **Charles Tipton**, who are completing three-year terms on Council.

IV. State of the Society

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

Strategic Planning

The Society is planning for another Strategic Plan Meeting, October 30–November 1, 2005. Granger said that the two previous Strategic Plan meetings have served the Society well, allowing APS to set priorities and goals for the coming years. Input from the membership survey, of which over 1,700 members responded, will be used in the planning process. He said that the firm of Cambridge Concord & Associates has been contracted to assist in the development of the Strategic Plan. Attendees at the meeting will include the APS Council, members of the Section Advisory Committee, and members of the Long Range Planning Committee.

Publications

Granger said that the APS has a long history of excellence and innovation with regards to its journals. The

APS Journals have been available online since 1994, with free access after 12 months. The APS also implemented one of the first systems for manuscript submission online. He reported that the Legacy Project has now been completed, and journal content from 1898 to the present is available online.

He reported that the impact and quality of the journals has continued to increase as reflected by a number of measures. One of these measures is the impact factor. Most of the Society's journals have impact factors that fall within the top 10% of all biomedical journals. Additionally, interest in the journals continues to increase as reflected by the rise in manuscript submissions and the growing number of hits on the journals' websites, which exceeded 35 million hits last year. He said that the efficiency of the journal production process is also increasing as reflected by the shorter time to print, which now averages less than three and one-half months from submission to publication.

He reported in the past year the journal *News in Physiological Science* had its name changed to *Physiology*, and has a new format and has changed its content. Granger said that the editor of *Physiology*, **Walter Boron**, and the APS staff has done an outstanding job with the journal and that many positive comments have been received from the membership.

DC Principles

Granger said that, in the past year, the Society has devoted considerable energy to the issue of free access. He said that APS Executive Director **Martin Frank** has done an outstanding job dealing with this issue on behalf of the Society, assuming a leadership role in the creation of the DC Principles Coalition for Free Access to Science. This coalition consists of 64 publishers that publish 200 journals and provide over half a million free articles to the public. The coalition is dedicated to providing free access to content either immediately or within months, depending on the publishers' business and production requirements.

NIH Public Access Plan

Granger said that NIH had recently announced its Public Access Policy, which asks NIH-funded authors to voluntarily submit their manuscripts

to the PubMedCentral database. The intent is to create a more permanent archive for NIH-funded research, and provide public access to NIH-funded research. Granger said that in response to this plan, the Society would modify its copyright statement to allow authors to participate in the NIH public access program, abide by the Society's embargo period, and help the Society recover the costs associated with its publication program.

Scientific Meetings

Granger said that, in the past year, much effort had been devoted to the planning and organizing of the XXXV International Congress. APS hosted the meeting along with five other societies: the Society of Neuroscience, the Microcirculatory Society, the Society of General Physiologist, the Biomedical Engineering Society, and the Society for Integrative and Comparative Biology. Granger thanked the many APS members and staff who worked on the meeting. He also offered a special thanks to **Shu Chien**, Chair of the National Organizing Committee; **Walter Boron**, Chair of both the International Science Program Committee and the US Scientific Program Committee; **L. Gabriel Navar**, Chair of the Fundraising Committee; and **Allen Cowley, Jr.**, President, IUPS, for their work on the Congress.

Granger said that the Congress was very successful with a number of outstanding lectures and symposia. The APS provided over 200 international travel awards to the Congress; and financial support was received from more than 30 companies and over 1,800 APS members.

Future APS Meetings

The APS is sponsoring a summer conference organized by **Celia Sladek**. It is the APS Physiological Genomics Conference: *Neuro-hypophyseal Hormones: From Genomics and Physiology to Disease*, July 16–20, 2005, in Steamboat Springs, CO.

Public Affairs

Granger said that, with respect to Public Affairs, the Society is focusing on two areas of concern—Biomedical Research Funding and the Use of Animals in Research. He said that the Society's biomedical research funding effort is coordinated with FASEB and

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AAMC to lobby Congress about the negative budget cuts proposed for NIH, NSF and other agencies that provide biomedical research funding.

Granger said that APS is working with other agencies to ensure that the use of animals in biomedical research will continue. He reported that the animal activists' demonstration at the Congress had been peaceful.

Education

Granger said that last year the Society's minority and education programs were recognized with a Presidential Award for Excellence in Science, Math, and Engineering Mentoring. This recognition reflects the dedication and innovation of the Society's Education Committee, chaired by **Robert Carroll**, as well as the efforts of the APS Education Officer **Marsha Matyas**.

Granger reported that there are a number of ongoing collaborative projects between the APS and the Association of Chairs of Departments of Physiology (ACDP). The projects deal with a number of issues related to physiology education and training, and they focus on providing resources for use by both teachers and students. The newest project is the Course Directors Website for Medical Physiology. This is an excellent resource for physiologists who are charged with organizing and coordinating medical physiology courses.

V. Report on Membership

A. Summary of the Membership Status

President-Elect **Douglas C. Eaton** reported on the status of the Society membership. As of March 1, 2005, the current membership of the Society is 9,610, of which 7,170 are regular members, 35 are honorary members, 1,118 are emeritus members, 42 are affiliate members, and 1,245 are student members. The Society also has 23 Sustaining Associate members.

B. Deaths Reported Since the Last Meeting

Eaton read the names of those members whose deaths had been reported since the last meeting. The membership stood and observed a moment of silence

in tribute to their deceased colleagues.

VI. Awards and Presentations

A. Ray G. Daggs Award

Ray G. Daggs was the APS Executive Secretary-Treasurer from 1956 until his retirement in 1972. In tribute to his devotion to the Society, the Ray G. Daggs Award was established, and is given annually to a physiologist for distinguished service to the Society and to the science of physiology. The 2005 Daggs Awardee is **David F. Bohr**, University of Michigan Medical School.

Bohr has been a distinguished leader in physiological research and has provided outstanding service to the profession of physiology in general and to the American Physiological Society in particular for many years. His leadership had a highly significant impact on the APS from 1966 when he first served on the Membership Committee, until 1986 when he completed his term as Associate Editor for the *American Journal of Physiology: Heart and Circulatory Physiology*. He has served the Society as a Member of Council and as its 51st President (1978-79). As President, he instituted a Standing Committee on Career Opportunities in Physiology to try to help young people during their early careers. He also initiated a meeting between the APS Animal Care Committee and representatives of animal welfare groups at a time when it was possible to actually make progress with such interactions.

Bohr served on the Editorial Boards of the *American Journal of Physiology* and the *Journal of Applied Physiology*, as co-editor of the circulation section of the *American Journal of Physiology*, and as Associate Editor of the *American Journal of Physiology: Heart and Circulatory Physiology*. He also served as editor of the *Handbook of Physiology, Vascular Smooth Muscle*.

As a scientist, Bohr has had a long and distinguished research career in cardiovascular physiology. He has focused almost entirely on two major areas: the contractile machinery of vascular smooth muscle, and the mechanism involved in the increased pressure in hypertension.

Bohr has been honored with numerous awards and distinguished lecture-

ships. He received the Wiggers Award of the American Physiological Society in 1977, and the CIBA Award for Hypertension Research in 1984. He also received the Gold Heart Award of the American Heart Association in 1990, and the American Society of Hypertension Special Achievement Lectureship in 1991. At age 89, Bohr continues to actively pursue research, having published his most recent paper in 2003, and regularly attends the EB meetings.

In his accepting the Ray G. Daggs Award, Bohr said that he "appreciates the award and looks forward to many more. Thank you."

B. Arthur C. Guyton Teacher of the Year Award

The Arthur C. Guyton Teacher of the Year Award was established in 1993 by the Teaching of Physiology Section and is supported by the W.B. Saunders Company, publisher of Guyton's *Textbook on Medical Physiology*, used to educate generations of medical and physiology students. The Arthur C. Guyton Physiology Educator of the Year Award is selected by the Teaching Section and is presented to an APS member who is a full-time faculty member at an accredited colleges or universities. The Selection Committee selects a candidate for the Award who demonstrates evidence of: (1) excellence in classroom teaching over a number of years at undergraduate, graduate, or professional levels; (2) commitment to the improvement of physiology teaching within the candidate's own institution; and (3) contributions to physiology education at the local community, national or international levels. This year's selection committee was chaired by **Jonathan Kibble** who will present the Award along with William Schmitt, Elsevier.

Robert W. Gore obtained his PhD from University of Iowa in 1968 and thereafter moved to University of Arizona at Tucson, where he has been a Professor of Physiology since 1979. Gore has maintained an impressive research output in the field of micro-circulatory physiology and has held Visiting Research Professorships internationally. This award is, of course, the result of Gore's outstand-



APS President **D. Neil Granger** presents the **Ray G. Dags Award** to **David F. Bohr**.

ing contributions as an educator. He has demonstrated excellence in the classroom at all levels from grammar school through undergraduate physiology education to medical school. Many letters and evaluations attest to the motivation and enthusiasm Gore has passed to his students. Activities such as the development of an online medical physiology curriculum and cardiovascular model, which are used worldwide, provide evidence of his commitment to improve physiology education globally. Gore has excelled at aspects of education from community service to advising, teaching and curriculum development. The committee is confident that Gore's award continues the tradition of excellence in physiology education embodied by the Arthur C. Guyton Award.

Granger introduced William Schmitt from Elsevier, who made the presentation to **Robert Gore**, University of Arizona.

Gore thanked the APS Teaching Section and the APS for the great honor. He said the he "would say one thing about teaching, people who tell the story, tell the story. Guyton told the story and shaped the culture for over 50 years. So to receive this award is a great honor. Thank you very much."

C. Bodil Schmidt-Nielsen Award

The Bodil M. Schmidt-Nielsen Distinguished Mentor and Scientist Award honors a member of the Society who is judged to have made outstanding contributions to physiological research and demonstrated dedication and commitment to excellence in



Jonathan Kibble presents the **Arthur C. Guyton Teacher of the Year Award** to **Robert W. Gore**.

training of young physiologists. The award was established to recognize Bodil M. Schmidt-Nielsen, the first woman President of the Society and a distinguished physiologist who has made significant contributions in her field. The recipient of the 2005 Bodil Schmidt-Nielsen Award is **Christin Carter-Su**, University of Michigan.

D. Giles F. Filley Memorial Awards

As a result of a bequest from the family of Giles F. Filley, a memorial fund was established in 1993 to recognize excellence in respiratory physiology and medicine. Two annual awards of \$20,000 are made to investigators who hold an academic rank no higher than assistant professor and are pursuing research in respiratory physiology and medicine. Awards are made to APS members working in the United States, who have demonstrated outstanding promise based on their research program. This year the



APS President **D. Neil Granger** presents the **Bodil Schmidt-Nielsen Award** to **Christin Carter-Su**.

Society is pleased to recognize the promise of **Susan M. Majka**, University of Colorado HSC and **David D. Fuller**, University of Florida.

E. Lazaro J. Mandel Young Investigator Award

As a result of a bequest from the wife of Lazaro J. Mandel, a memorial fund was established in 1999 to recognize excellence in epithelial or renal physiology. An annual award is made to an investigator who holds an academic rank no higher than assistant professor and is pursuing research in epithelial or renal physiology. An award is made to an APS member working in the United States who has demonstrated outstanding promise based on his or her research program. Each award is for \$7,500 and is designated for the use of the awardee in his/her research program. Granger

(continued on page 182)



APS President **D. Neil Granger** presents the **Giles F. Filley Award** to **Susan M. Majka**.



APS President **D. Neil Granger** presents the **Giles F. Filley Award** to **David D. Fuller**.



APs President D. Neil Granger presents the Lazaro J. Mandel Young Investigator Award to Rong Ma.

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presented the 2005 Mandel Award to **Rong Ma**, University of North Texas Health Science Center.

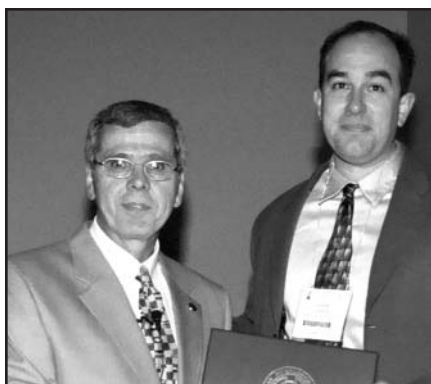
F. Shih-Chun Wang

Young Investigator Award

As a result of a bequest from the wife of Shih-Chun Wang, a memorial fund was established in 1998 to recognize excellence in physiology. An annual award is made to an investigator who holds an academic rank no higher than assistant professor and is pursuing research in physiology. An award is made to an APS member working in the United States who has demonstrated outstanding promise based on his or her research program. Each award is for approximately \$7,000 and is designated for the use of the awardee in his/her research program. This year the Society is pleased to recognize the promise of **David L. Allen**, University of Colorado, Boulder.

G. Liaison with Industry Awards

The Liaison With Industry Awards are given to the graduate student and the postdoctoral fellow submitting the best abstract describing a novel disease model. This is the fifth year this award has been given. Granger and **Chahrzad Montrose-Rafizadeh**, Chair of Liaison with Industry Committee, presented the 2005 Liaison with Industry Awards to **Amelia Purser Bailey**, University of Mississippi Medical Center, and **Patrick Fueger**, Duke University.



APs President D. Neil Granger presents the Shih-Chun Wang Young Investigator Award to David L. Allen.

H. David S. Bruce Awards

The annual David S. Bruce Awards for Excellence in Undergraduate Research is granted to up to four currently enrolled undergraduate students who are first authors on a poster presented at the EB meeting. Each will receive a cash award of \$500. This year the Society is pleased to recognize **Elizabeth Gluck**, Williams College; **Heidi Pederson**, University of California, San Diego; **Carmen Troncoso**, University of New Mexico; and **Sophie Yeo**, University of Birmingham, United Kingdom.



Chahrzad Montrose-Rafizadeh, representative of the APS Liaison With Industry Committee, presents the Liaison With Industry Award to Amelia Purser Bailey.

I. Caroline tum Suden / Frances Hellebrandt Professional Opportunity Awards

Thirty-six awards were made possible by the bequests of Caroline tum Suden and Frances Hellebrandt, who were long-time members of the Society. Awards are open to graduate students or postdoctoral fellows who present papers at the spring meeting. Recipients receive a \$500 check for travel to the Experimental Biology meeting, paid registration, and have access to the FASEB Placement Service. **Siribhinya Benyajati**, Chair of the Women in Physiology Committee, presented the awards.

J. Minority Travel Fellowships

Frank announced that 42 Minority Travel Fellowship awards, funded by NIDDK and NIGMS, were presented to minority students to help them attend the XXXV IUPS Congress.

K. Porter Travel Fellows Award

The Porter Physiological Development Awards are designed to support the training of talented students entering careers in physiology by providing pre-doctoral fellowships for underrepresented students. Each award includes an \$18,000 stipend. This year's recipients are: **Christina Bennett**, University of Michigan; **Adrienne Bratcher**, University of Louisville School of Medicine; **Jessica Clark**, University of Arizona; **Alfredo**



Chahrzad Montrose-Rafizadeh, representative of the APS Liaison With Industry Committee, presents the Liaison With Industry Award to Patrick Fueger.



APS President **D. Neil Granger** presents a certificate of appreciation to **Penelope A. Hansen**, **Outgoing Chair of the Teaching of Physiology Section.**

Garcia III, Wright State University; **Damon Jacobs**, University of North Carolina, Chapel Hill; **Walson Metzger**, UMDNJ; **Gary Morris**, Eastern Virginia Medical School; and **Stefanie Raymond-Whish**, Northern Arizona University.

L. Undergraduate Summer Research Fellowships

This year the APS will support 12 undergraduate summer research fellowships. These fellowships allow full-time undergraduate students to work in the laboratory of an established investigator. The intent of the program is to excite and encourage students to pursue a career as a basic research scientist. The award includes a \$3,000 summer stipend and \$1,000 for travel to the next Experimental



APS President **D. Neil Granger** presents a certificate of appreciation to **Andrea Gwosdow**, **Outgoing Chair of the Communications Committee.**

Biology meeting. The year's recipients are: **Patrick Brown**, Juniata College; **Marisol Chang**, University of Texas at Arlington; **Elizabeth F. Gluck**, Williams College; **Sarah Jean Hemauer**, University of Wisconsin, Madison; **Bryan P. Lloyd**, University of Nevada, Las Vegas; **Dewan S.A. Majid**, Stanford University; **Kavita M. Ponnappa**, University of North Carolina, Charlotte; **Lyndsay K. Roberts**, Mississippi State University; **Brian F. Sadacca**, University of Pittsburgh; **Alison A. Staton**, University of Dayton; and **Florence Wu**, Yale University.



Dale Benos, **Outgoing Chair of the Publications Committee**, received a certificate of appreciation from **APS Publications Director Margaret Reich**, and **Incoming Committee Chair Kim Barrett**, at the **Editorial Banquet**, and was later presented with another certificate from **APS President D. Neil Granger** at the **Business Meeting.**



APS President **D. Neil Granger** presents a certificate of appreciation to **William H. Dantzler**, **Outgoing Chair of the Ray G. Dags Committee.**

M. Recognition of Outgoing Section Chairs

Matthew Grisham, Chair of the **Gastrointestinal and Liver Physiology Section**; **Penelope A. Hansen**, Chair of the **Teaching of Physiology Section**; and **Susan M. Wall**, Chair of the **Renal Section**; **Charles Lang**, Chair of the **Endocrinology and Metabolism Section**; complete their terms at the close of this meeting. Granger thanked them for their service to their sections and to APS.

N. Recognition of Outgoing Committee Chairs

Granger recognized the outgoing committee chairs and thanked them for their service to the APS. The outgoing chairs are **Patricia Preisig**,

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APS President **D. Neil Granger** presents a certificate of appreciation to **Hector Rasgado-Flores**, **Outgoing Chair of the International Physiology Committee.**



APS President **D. Neil Granger** presents a certificate of appreciation to **Carole Liedtke**, **Outgoing Chair of the Women in Physiology Committee.**



APs President **D. Neil Granger** presents a certificate of appreciation to **Virginia Miller**, Outgoing Councillor.

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Chair of the Awards Committee; **Andrea R. Gwosdow**, Chair of the Communications Committee; **William H. Dantzer**, Chair of the Ray G. Daggs Committee; **Hector Rasgado-Flores**, Chair of the International Physiology Committee; **Glenn A. Reinhart**, Chair of the Liaison with Industry Committee; **Raouf A. Khalil**, Chair of the Membership Committee; **Klaus W. Beyenbach**, Chair of the Perkins Memorial Fellowship Committee; **Pamela Gunter-Smith**, Chair of the Porter Physiology Development Committee; **Dale Benos**, Chair of the Publications Committee; and **Carole Liedtke**, Chair of the Women in Physiology Committee.



APs President **D. Neil Granger** presents a certificate of appreciation to **Charles Tipton**, Outgoing Councillor.

Granger also thanked **Hector Rasgado-Flores** for composing the symphony "Body Notes," which was to be performed as part of the Closing Ceremonies of the Congress.

O. Recognition of Outgoing Councillors

Councillors **Virginia Miller** and **Charles Tipton** will complete their terms at the close of this meeting. Granger expressed his pleasure at having had the opportunity to serve on Council with them and recognized their dedication and guidance to the Society. Granger said that "it has been a pleasure to serve with them and I thank them for their three years of service to the Society."

John Williams was recognized for

his service as APs President. When presenting Williams with the Past-President plaque Granger said "Now it gives me great pleasure to recognize John Williams, who is completing his three-year term on the Executive Cabinet—first as President-elect, then as President, and a final year as Past-President. John has given us three years of outstanding service and we are very grateful for his leadership."

P. New Business

No new business.

VII. Passing of the Gavel

Granger then passed the gavel to **Douglas C. Eaton**, Emory University School of Medicine, incoming President of the American Physiological Society.

Granger said that he would "like to thank the Society for the privilege of allowing me to serve as your President in the past year. It has been both a professionally and personally rewarding experience." He then introduced Eaton and presented him with the gavel. Doug said, "I would like to thank Neil for his efforts as President of the Society, and I look forward to his sage advice as to what I am supposed to do at this podium!"

There being no new business, the meeting was adjourned at 6:45 PM, April 4, 2005. ❖

Douglas C. Eaton
President-Elect



APs Past-President **John Williams** presents a certificate of recognition to **Ormond MacDougald** for the Henry Pickering Bowditch Award.



APs President **D. Neil Granger** presents a certificate of recognition to **Gerald DiBona** for the Walter B. Cannon Memorial Award.



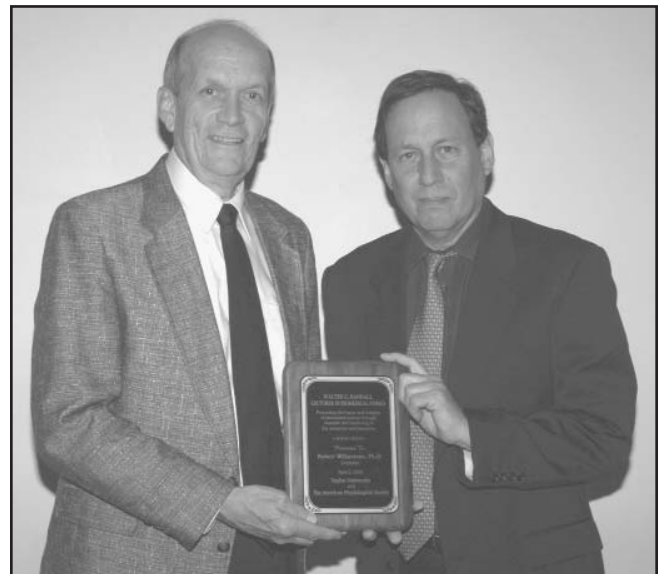
APS Council: (left to right) Susan Barman, Martin Frank, Thomas Lohmeier, D. Neil Granger, Douglas Eaton, John Williams, Kim Barrett, Helen Raybould, Curt Sigmund, Robert Carroll, Jeff Sands, Carole Liedtke, Irving Zucker, Peter Wagner, Virginia Miller, and Charles Tipton.



APS Past Presidents: Back row: John West, Douglas Eaton, Gerald DiBona, John Williams, Brian Duling. Front row: William Dantzer, Allen Cowley, Jr., Barbara Horwitz, Shu Chien, D. Neil Granger, Walter Boron, and James Schafer.



APS President D. Neil Granger presents a commemorative plaque to APS Past-President John Williams.

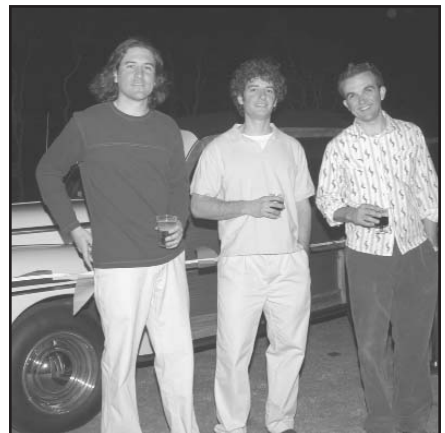


Tim Burkholder presents a plaque to Robert Williamson who gave the Walter C. Randall Lecture on Biomedical Ethics.

IUPS 2005 Memories







IUPS 2005—From Genomes to Functions

The passing of the IUPS flag from **Shu Chien**, Chair, IUPS 2005 National Organizing Committee (NOC), to Akimichi Kaneko, IUPS 2009 Organizing Committee, was a memorable moment for all those involved in the planning and execution of the XXXVth International Congress of Physiological Sciences. It represented the end of a wonderful, though at times tortuous, journey that began in St. Petersburg, Russia in 1997.

At the 1997 IUPS Congress, the United States was one of eight countries that submitted a bid to host the Congress in 2005. **Stanley Schultz**, Chair, IUPS US National Committee, comprised of representatives from the American Physiological Society (APS), Society for Neuroscience, Society for Integrative and Comparative Biology, Society of General Physiologists, the Microcirculatory Society, and the Biomedical Engineering Society, made the presentation in St. Petersburg. The official letter of invitation was issued by Bruce Alberts, President of the National Academy of Sciences, and it noted that the last IUPS Congress held in the United States was in 1968 and that "a US meeting will provide a fertile venue for formal and informal communication and interaction between physiologists of many nations." In making the presentation, Schultz invited the IUPS to hold the 2005 Congress in Washington, DC in August.

The APS Council and the National Organizing Committee (NOC) began to have second thoughts about the timing and location of the Congress as it prepared to re-confirm its bid at the 2001 IUPS Congress in Christchurch, New Zealand. Would the international physiological community want to spend a balmy summer week in Washington, DC? Would the program be strong enough to draw physiologists away from the Experimental Biology meeting, the venue where many US and foreign physiologists would have already presented their work?

Shu Chien and **Allen Cowley, Jr.**, outgoing NOC Chair, worked closely with Ewald Weibel, IUPS President,

prior to the Christchurch Congress to convince all parties that holding the IUPS 2005 Congress in conjunction with the Experimental Biology 2005 meeting would be beneficial to the Congress and physiology. The IUPS Council was concerned that the Congress would lose its identity if it were held in conjunction with the larger EB meeting. Similarly, the Experimental Biology Board needed to be convinced that a joint IUPS Congress/Experimental Biology meeting was beneficial and that the EB meeting would not be overwhelmed by the world physiological community. Both groups were satisfied by the suggestion that the two meetings would not completely overlap; the IUPS Congress would start a day earlier in order to develop its identity before the start of the EB meeting.

At the Christchurch Congress, the IUPS General Assembly accepted the US invitation to meet in San Diego in 2005, holding the IUPS Congress in conjunction with the Experimental Biology 2005 meeting. It was, therefore, official and the US, represented by Chien, accepted the IUPS flag from Tony Macknight representing New Zealand, at the close of the 2001 IUPS Congress.

The IUPS 2005 National Organizing Committee was thus charged with moving the planning for the Congress into high gear. The NOC put together several committees to coordinate the planning and development of the Congress. The most critical committees, the International and US Scientific Program Committees (ISPC and USSPC), were chaired by **Walter Boron**. The Fundraising Committee was chaired by **L. Gabriel Navar**, and the Local Arrangements Committee was chaired by **Frank Powell**.

The NOC issued an invitation to the world physiological community to submit suggestions for the scientific program. Additionally, Boron consulted closely with the APS Joint Program Committee, chaired by **Curt Sigmund**, to create a cooperative environment to draw upon their traditional expertise in planning the program within the Experimental Biology

framework. The goal of the USSPC and ISPC was to create *programming tracks* that would carry a particular topic (such as muscle) from the molecule to comparative genomics, to genetic models, to disease, to higher level functions. In response to the call for proposals, the USSPC/ISPC received over 300 suggestions for symposia, featured topics, tracks, and satellite meetings. It was impossible to use all of the suggestions because of scheduling limitations, overlap, relevance, and international representation. However, the USSPC/ISPC was able to cull through the proposals to build a strong program while insuring that there was adequate international representation on the program. From these suggestions, the Committee identified the topics and organizers for over 150 symposia, featured topics, lectures and workshops which were programmed into the 15 programming tracks: Calcium Signaling, Cardiac, Ecophysiology for the 21st Century, Epithelia, Feeding, Fuel and Fat, Genomics, Mechano- and Chemotransduction, Muscle and Exercise, Neural Control of Locomotion: From Genes to Behavior, Renal Control of Blood Pressure, the Regulatory Brain, Thermoregulation and Energetics, Tissue Dynamics in the Lung, and Vascular Physiology.

The symposia, lectures and featured topic program involved over 475 scientists with nearly 40% from outside of the United States, and 15% of the speakers were female. In addition, 2,993 IUPS abstracts were submitted for the initial abstract submission deadline, along with 196 late breaking IUPS abstracts. These represented 35.7% of the 8,903 abstracts submitted for the joint IUPS/EB meeting (Table 1). The overall scientific registration for the IUPS/EB meeting was 12,613. Scientific registrants were asked to identify their society affiliations at the time of registration, resulting in some individuals selecting affiliation with multiple societies. As a result, there were 15,220 affiliations noted by the registrants of which 36.8% or 5,601 were associated with physiology. The IUPS/EB meeting also

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had an extensive exhibit program consisting of 557 exhibit booths provided by 405 companies.

The National Organizing Committee and International Scientific Program Committee also designated a number of satellite meetings as official meetings of the XXXV Congress. The meetings were scheduled within a 150-mile radius of San Diego and held immediately before or after the Congress. To further encourage the participation of satellite meeting participants in the Congress, individuals who registered for both a satellite meeting and the Congress received a \$50 credit on the combined registration fee. In addition, the NOC offered the satellite organizers two \$1000 travel awards for their meetings. The meetings held as pre-Congress satellites included: 4th International Meeting on Rapid Responses to Steroid Hormones; Biophysical Adaptation and Bioinspired Engineering; Coordinating Hemodynamic, Filtration, and Reabsorptive Functions of the Kidney; Dyspnea: Mechanisms and Management; From Metabolome to Function via Dynamic Measurements and Computational Models; In Silico Physiology: From Genome to Physiome; Mechanism of the Acupuncture Treatment in Disease; The Prenatal Environment, Programming and Postnatal Consequences; and Urothelial Cell Physiology in Normal and Disease States. The tradition of offering an IUPS Teaching Workshop in conjunction with the IUPS Congress was continued as a post-Congress satellite.

As an international meeting, the NOC wished to encourage the participation of as many foreign scientists as possible in the IUPS Congress. Consequently, it allocated approxi-

mately \$200,000 in support of an IUPS Travel Award program designed to encourage the participation of students and physiologists who are within 15 years of receiving their doctoral degree. The emphasis was placed on physiologists from underdeveloped countries and underrepresented minorities from the United States who had submitted abstracts to the Congress. Applications for travel awards were received from 413 individuals from over 65 countries and awards were made to 167 applicants. In addition, the APS and its disciplinary sections made awards to over 125 additional graduate students and postdoctoral fellows from both the US and abroad in recognition of their scientific presentations.

Of the 167 IUPS travel awards made, only 140 individuals were able to accept the awards because of inadequate support from their institutions, as well as difficulties associated with obtaining travel visas as a result of the newly instituted USA Patriot Act. The APS worked closely with the National Academy of Sciences to facilitate efforts by travel award recipients and Congress attendees to obtain their visas for the meeting. Of the 119 respondents to a Post-Congress Travel Award Recipient Survey, 56 award recipients were graduate students and 37 received their doctoral degrees between 2000 and 2004. When the respondents were asked how they would rate the 35th IUPS Congress, 87% or 104 rated the Congress as an 8 or higher (with 10 being best). Additional details of the IUPS Travel Award Program can be found in a related article.

The Opening Ceremony was held on Thursday, March 31 and involved presentations from Chien, Chair, NOC, Cowley, Jr., IUPS President, **Virginia**

Huxley, Chair, US National Committee of the IUPS, and **D. Neil Granger**, President, APS. After declaring the opening of the 35th IUPS Congress with the theme of "From Genomes to Functions," Chien welcomed the world physiological community to San Diego, CA, where he resides, and read a proclamation issued by the Mayor of San Diego, Dick Murphy. The proclamation noted that this was only the third meeting of the IUPS in the United States and the first to be held in San Diego. The proclamation ended as follows: "Now, therefore, I, Dick Murphy, the thirty-third Mayor of the City of San Diego, do hereby proclaim March 31, 2005, to be 'International Union of Physiological Sciences Day' and welcome 6,000 attendees of the 35th Congress to America's finest city, wishing everyone a happy and productive stay." Chien thanked the IUPS leadership, NOC members, APS, the Program Committees, EB, and all participants for working together to ensure the success of the Congress, which would make great impacts on the advancement of physiological sciences and the enhancement of health and well being of humankind.

Cowley acknowledged the efforts of US physiologists and of the APS to create an outstanding scientific program in an exciting venue. He also expressed his appreciation to the strong participation of the international physiological community in the 35th IUPS Congress. Huxley highlighted the venues of past IUPS Congress that were the steps leading up to the San Diego Congress: St. Petersburg, Russia, to Christchurch, New Zealand, and on to San Diego.

Granger welcomed the Congress attendees on behalf of the American Physiological Society. He noted that the IUPS has a long and successful history of organizing international meetings that have served to highlight and promote the progress of Physiology and to bring together physiologists from around the world in a forum for scientific exchange, for the creation of new research collaborations, to renew old friendships, and to forge new alliances.

Granger commented that in the 115-year history of the international physiological congresses, the

Table 1. IUPS/EB 2005 Abstracts and Society Affiliations

Discipline/Society	Abstracts	Affiliations/Attendance
Physiology	3,189	5,601
Anatomy	375	505
Biochemistry/Molecular Biology	1,172	1,969
Immunology	1,525	2,554
Nutrition	1,290	2,445
Pathology	566	725
Pharmacology	710	1,421
Teaching & Computer Sessions	76	
TOTAL	8,903	15,220

American Physiological Society has had the privilege of hosting an international Congress on two previous occasions. He then proceeded to provide the attendees with an overview of those earlier US Congresses.

In 1929, the 13th Congress was held in Boston. Sixteen hundred members from 41 countries attended the Boston meeting, with 540 making the journey by sea from Europe. Most made the crossing on one of three ships—the SS *Stuttgart*, the SS *France*, and the *Minnekahda*, which transported four hundred physiologists from 20 nations and made the crossing in 10 days.

The physiologists on board “turned the voyage into virtual mini-congress.” Many prominent physiologists of that era made the voyage to Boston, including Ivan Pavlov, A.V. Hill, and Otto Loewi. Indeed, nine of the passengers on the *Minnekahda* alone went on to receive the Nobel Prize in Physiology and Medicine.

The Boston meeting consisted of 495 scientific communications presented in six parallel sessions and the official languages included English, French,

German and Italian. While the meeting proved to be an immense success, the next international physiology congress was not hosted by the US for another 38 years.

In 1968, the 24th Congress was held in Washington DC. The Washington Congress included over 3,600 active members of which one third were drawn from 56 foreign countries. The program of that meeting included five recipients of the Nobel Prize in Physiology & Medicine, and an additional 10 scientists who would go on to win the Award, including Hans Krebs, Rosalyn Yalow, and Robert Furchgott.

Granger expressed pleasure and pride as he welcomed all Congress participants, but especially the foreign delegates to this Congress. “We hope that you share our sense of satisfaction that this assembly, like those before it, will highlight the remarkable progress that has been made in physiology—a scientific discipline that remains as essential and relevant to medical progress today as it was when the first international physiology congress was held in our country over 75

years ago.” As with earlier Congresses, the 35th IUPS Congress program included three recipients of the Nobel Prize, including **Peter Agre**, the Fenn Lecturer as well as **Eric Kandel** and **Erwin Neher**, and as in the past, others in attendance at the 35th Congress will likely win Nobel Prizes in the future.

Since 1901, the participants in the IUPS Congress have been able to purchase a commemorative medal. While medals have not been available for every Congress, they have been provided to attendees at 17 of the 34 IUPS Congress. With the encouragement of **Ralph Sonnenschein**, APS member, the National Organizing Committee decided to continue the tradition and commissioned Alex Shagin to capture the theme of the IUPS Congress “From Genomes to Functions” on a commemorative medal. It was designed to provide Congress attendees and physiologists a medal to commemorate the hosting of the IUPS Congress in the United States.

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Table 2. XXXV IUPS Congress Corporate Contributors

IUPS expresses its sincere appreciation to the following organizations for their contributions in promoting the physiological sciences:

21st Century Platinum

American Physiological Society
Cadmus Communications

21st Century Gold

GlaxoSmithKline Pharmaceuticals
International Union of Physiological Sciences
National Science Foundation
National Aeronautics and Space Administration

21st Century Silver

ADInstruments Pty Ltd
AstraZeneca Pharmaceuticals
Institut de Recherche Servier
Journal of Physiology

21st Century Bronze

Amylin Pharmaceuticals
Biomedical Engineering Society
Eli Lilly & Company
Elsevier Inc.
Merck Research Laboratories
Pfizer, Inc
Society for Neuroscience
Takeda Pharmaceuticals North America Inc.

21st Century Corporate

Burroughs Wellcome Fund
Johnson & Johnson Family of Companies
The Microcirculatory Society
Mylan Bertek Pharmaceuticals Inc.
Novartis Institutes for BioMedical Research
Society for Integrative and Comparative Biology
Wyeth Research

21st Century Donor

Abbott Laboratories
Astra Pharmaceuticals
Bristol Myers Squibb
Chinese Physiological Society
Department of Physiology, University of Nebraska Medical Center, Omaha, Nebraska
Experimental Physiology
Georgetown University Center for the Study of Sex Differences in Health, Aging and Disease
The Grass Foundation
Living Systems Instrumentation
Mini Mitter
Pharmanex, An NSE Company
ScholarOne
Society of General Physiologists
Taylor University
University of Missouri Center for Gender Physiology

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Following the presentation of the opening Fenn Lecture by **Peter Agre** on the topic of "Aquaporin Water Channels: From Atomic Structure to Clinical Medicine," Congress attendees enjoyed drinks and a buffet dinner on the San Diego Convention Center terrace overlooking San Diego Harbor. As Congress registrants mingled, renewed old acquaintances and talked science, the Jason Robinson Quartet provided them with the sounds of jazz, a truly American form of music.

Following the IUPS President's Lecture, presented by Cowley, Congress participants were invited to participate in another American tradition, a casual IUPS Beach Party featuring typical Southern California beach music, ambience, and barbeque, which was held near Seaport Village. The Mar Dels provided the music while the physiological community ate and drank typical beach food - hamburgers, hot dogs, and beer. Attendees participated in a number of beach activities set up on the North Embarcadero, including volleyball, keg races, and surfing. The evening culminated with a 10-minute fireworks display to the surprise and pleasure of the international community.

The 35th Congress of Physiological

Sciences was not just an opportunity to exchange research findings. It was also an opportunity for the animal rights community to demonstrate against animal research. The San Diego Animal Advocates and Michael Budkie of Stop Animal Exploitation Now organized a demonstration in front of the San Diego Convention Center on Sunday, April 3. The theme of the march was "Mad Scientists" and involved about 30-35 protestors in masks and lab coats. The demonstrators silently protested the "waste of our tax dollars to injure, torture, and kill animals with no discernible benefit to humans."

The Closing Ceremony was held at Copley Symphony Hall. Cowley thanked the host country for providing the international community of physiologists with an outstanding scientific meeting and social activities to promote interactions between colleagues from around the world. Chien expressed his appreciation for the support provided by the IUPS and international community and how pleased the US was to have had an opportunity to host the Congress once again. Chien also expressed his sadness that the Congress must end and that it was time to pass the IUPS flag to the next host country—Japan. Akimichi Kaneko

accepted the flag from Chien, congratulated the US on an outstanding meeting and invited the world physiologists to the 2009 Congress in Kyoto, Japan.

Martin Frank then introduced the final element of the IUPS Congress, the world premiere performance by the San Diego Chamber Orchestra led by Nuvi Mehta of "Body Notes," a symphonic suite comprised of 13 movements dedicated to the beauty of human physiology and written by APS member, **Hector Rasgado-Flores**. A full-description of the "Body Notes" is available at <http://www.iups2005.org/bodynotes.htm>.

Following the performance of "Body Notes," Granger hosted a reception for the IUPS and Society leadership, as well as Congress donors. During the reception, Rasgado-Flores presented a signed copy of the score of the symphony to Bruce Thomas, President, Cadmus Communications, the corporate sponsor of the performance. Granger also took the opportunity to express the Society's thanks and appreciation to all those corporations who provided financial support for the Congress (Table 2). He extended a special thanks to the nearly 2,000 members who generously provided financial support for the Congress. ❖

IUPS Travel Award Program

The 35th IUPS Congress National Organizing Committee allocated funds for a travel award program to encourage the participation of young scientists in the Congress. The goal of the program was to provide travel grants to physiologists from developing countries, as well as women and under-represented minorities who were within 15 years of receiving their doctoral degrees. The IUPS received 413 applications for the travel award program and were able to make awards to 167 applicants. The awards ranged in amount from \$1,500 to \$500. Unfortunately, because of financial difficulties and visa problems, only 140 candidates were actually able to attend the Congress.

For those who were able to attend, their participation in the Congress was eye-opening and life changing. As noted

by one award recipient, "The fruitful discussion with other participants gave us all new research ideas and new collaboration connections. The scientific sessions were simply excellent, bringing the frontier of science. The IUPS congress is one of the most important congresses I attend. I will start new projects and apply new grants based on the ideas I had in the congress. I also got some personal feedback from my presentation." Another award recipient commented "This experience of participation in the 35th IUPS Congress opened a new window for me. It helped me to get a new understanding of America and science. I got to know so many excellent scientists and what they were doing. At the same time I was moved by warm-hearted Americans."

After the Congress, award recipients were asked to complete a survey to

help the National Organizing Committee to assess the value of the travel award program. Of the 119 respondents to a Post-Congress Travel Award Recipient Survey, 56 award recipients were graduate students and 37 received their doctoral degrees between 2000 and 2004. The respondents were asked how they would rate the 35th IUPS Congress, 87% or 104 rated the Congress as an 8 or higher (with 10 being best). While only 37% of the awardees combined their attendance at the Congress with a visit to a research laboratory or attendance at a satellite meeting, over 78% used the Congress as an opportunity to develop collaborative research projects with colleagues. Similarly, 70% used the Congress as a means of identifying opportunities to work in another laboratory.

As noted in Table 1, the largest group of applications came from the Asian/Oceanic region which includes India (31 applications), Pakistan (8 applications), China (29 applications), Japan (7 applications), and Australia (13 applications). From Europe, the participation was greatest from the United Kingdom (13 applications), Russia (14 applications), and Hungary

(9 applications). From Africa, Nigerian physiologist submitted 26 applications and 9 were submitted by Egyptian scientists. Mexico (7 applications), Venezuela (6 applications), Brazil (10 applications) and Argentina (4 applications) contributed the most applications from Latin America. Overall, 40% of 413 award applicants received awards to attend the Congress. ❖

Table 1. Distribution of IUPS Travel Applications and Awards.

	Applications	Awards
Africa	56	26
Latin America	36	18
Asian	135	53
Europe	104	44
Canada	16	5
United States	66	21
Total	413	167

Graduate Students and Postdoctoral Fellows Receive tum Suden/Hellebrandt Professional Opportunity Awards

Graduate students and postdoctoral fellows who were first authors on an abstract submitted to International Union of Physiological Sciences/Experimental Biology 2005 in San Diego, CA were eligible to apply for the Caroline tum Suden/Frances A. Hellebrandt Professional Opportunity Award. The APS Women in Physiology Committee, chaired by **Siribhinya Benyajati**, University of Oklahoma Health Sciences Center, selected 36 awardees from a pool of 114 applicants. Applicants were chosen based on the quality and novelty of their abstracts, and letters written by the candidates describing their career goals, research, and why they were particularly deserving of the award. Each awardee received \$500, a certificate of recognition, and complimentary registration for the IUPS/EB 2005 meeting. Awards were presented during the APS Business Meeting. Awardees were:

Amelia Purser Bailey, Univ. of Mississippi Medical Center
Ian Bratz, Louisiana State Univ. Health Sci. Ctr.
Raul Camacho, Vanderbilt Univ. School of Medicine
Anthony Ross Cammarato, Boston Univ. School of Medicine
Christie Cefaratti, Case School of Medicine
Jessica A. Clark, Univ. of Arizona
Melanie Green Cree, Univ. of Texas Medical Branch
Daisy L. Daubert, Oregon Health & Sciences Univ.
Tara D'Eon, Tufts Univ.
Robert Bryan Dorman, Univ. of Arkansas for Med. Sci.
Carie Facemire, Univ. of North Carolina at Chapel Hill

Surovi Hazarika, East Carolina Univ.
Shawn D. Hingtgen, Univ. of Iowa
Darren S. Hoffmann, Univ. of Iowa
Radu Iliescu, Univ. of Mississippi Medical School
David W. Infanger, Univ. of Iowa
Keith Jackson, Tulane Univ.
Kyu-Tae Kang, Medical College of Georgia
Karen R. Kelly, Univ. of Southern California
Yanny E. Lau, Michigan State Univ.
Eric Lazartigues, Univ. of Iowa
Devaki Maduwegedera, Monash Univ.
Joseph Fomusi Ndisang, Univ. of Saskatchewan Coll. Med.
Sean C. Newcomer, Univ. of Missouri
Norma Ojeda, Univ. of Mississippi Med. Ctr.
Jeffrey J. Olearczyk, Medical College of Georgia
Erion Qamirani, Texas A&M Univ.
Marcella Raney, Univ. of Southern California
Reena Rao, Vanderbilt Univ. Medical Center
Sorachai Srisuma, Brigham & Women's Hospital, Harvard Medical Sch.
Lakshmi S. Tallam, Univ. of Mississippi Medical Center
Keshari Thakali, Michigan State Univ.
Ildiko Toma, Univ. of Southern California
Liliya M. Yamaleyeva, Wake Forest Univ. Health Sciences
Licy Lorena Yanes, Univ. of Mississippi Medical Center
Dan Ye, Mayo Clinic
Zivar Yousefipour, Texas Southern Univ.



The 2005 tum Suden/Hellebrandt Professional Opportunity Awardees.

Undergraduate Students Receive David S. Bruce Awards for Excellence in Undergraduate Research

Undergraduate students who were first authors on an abstract submitted to International Union of Physiological Sciences/Experimental Biology 2005 in San Diego, CA were eligible to apply for the David S. Bruce Awards for Excellence in Undergraduate Research.

The award is named in honor of APS member David S. Bruce (1939–2000), who served as Chair of the APS Teaching Section and was a professor of physiology at Wheaton College from 1978-2000. Bruce was a dedicated physiology educator who had a particular interest in engaging undergraduate students in scientific research. Bruce not only encouraged and supported his students in participating in research, but he also regularly brought undergraduate students to the Experimental Biology meeting, often to present their research findings.

The APS Education Committee, chaired by **Robert G. Carroll**, East

Carolina University, initially selected 13 finalists from a pool of 31 applicants. Finalists were chosen based on the quality and novelty of their abstracts and letters written by the candidates describing their career goals, research, and why they were particularly deserving of the award. The 13 finalists were:

Curt R. Canine, Univ. of Missouri-Columbia; **Laura Duling**, Univ. of New Mexico; **Harmon Fong**, McMaster Univ.; **Eric Gee**, York Univ.; **Elizabeth F. Gluck**, Williams College; **Crystal D. Little**, Tuskegee Univ./Henry Ford Hospital; **Trevor Luke**, New Mexico State Univ./Johns Hopkins Sch. of Med.; **Jessica P. Otis**, Bates College; **Heidi N. Petersen**, Univ. of California, San Diego; **Ross O. Smith**, Williams College; **Ryan Y.S. Suda**, Univ. of California, San Diego; **Carmen Troncoso**, Univ. of New Mexico; **Sophie E. Yeo**, Univ. of Birmingham, UK.

These students then made oral presentations of their posters to a subcommittee, chaired by **Thomas A. Pressley** (Texas Tech Univ. Health Science Center). Four awardees were selected based on their knowledge of their research project. Each awardee received \$500 and a certificate of recognition. Awards were presented by Carroll and APS President **D. Neil Granger** during a special APS Undergraduate Poster Session at IUPS/EB 2005. The awardees were:

Elizabeth F. Gluck, Williams College; **Heidi N. Petersen**, Univ. of California, San Diego; **Carmen Troncoso**, Univ. of New Mexico; **Sophie E. Yeo**, Univ. of Birmingham, UK.

APS congratulates all these students on the quality of their research and presentations. ❖



Bruce finalists (Back row, l to r): Robert Carroll (Chair, APS Education Committee), Ryan Suda, Harmon Fong, Trevor Luke, Ross Smith, Eric Gee, Curt Canine. **(Front row, l to r):** Crystal Little, Laura Duling, Carmen Troncoso, Sophie Yeo, Heidi Petersen, Elizabeth Gluck, Jessica Otis.



Bruce Awardees (l to r): Carmen Troncoso, Sophie Yeo, Heidi Petersen, Elizabeth Gluck

The American Physiological Society Medical Physiology Curriculum Objectives

<http://www.the-aps.org/education/MedPhysObj/medcor.htm>

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The **Medical Physiology Curriculum Objectives** is a joint project of The American Physiological Society and the Association of Chairs of Departments of Physiology.

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9650 Rockville Pike, Bethesda, MD 20814-3991
Phone: 301-634-7132; Fax: 301-634-7098; Email:
education@the-aps.org; <http://www.the-aps.org/education.htm>

David S. Bruce Undergraduate Research Awards

History

David S. Bruce (1939–2000) served as Chair of the APS Teaching Section and as a professor of physiology at Wheaton College from 1978–2000. Dr. Bruce was a dedicated physiology educator who played active roles in both the APS and the Society for Integrative & Comparative Biology. As an undergraduate educator at Wheaton College, Dr. Bruce had a particular interest in engaging undergraduate students in scientific research. Dr. Bruce not only encouraged and supported his students in participating in research, but he also regularly brought undergraduate students to the Experimental Biology meeting, often to present their research findings. In 2000, Dr. Bruce died at the age of 61 of complications following a kidney transplant. The David Bruce Award honors Dr. Bruce's commitment to promoting undergraduate involvement in research, in the APS annual meeting, and, ultimately, in research careers.

Procedure

The David S. Bruce Awards will be made each year at the Experimental Biology meeting to up to four undergraduate students who have both submitted abstracts for the meeting and award application materials (see below). Abstracts will be reviewed by the David S. Bruce Award Committee prior to the Experimental Biology (EB) meeting. The award committee includes selected members of the APS Education Committee and, if deemed necessary, additional APS members to provide a breadth of coverage for major topic areas. The Award Committee selects 12–15 finalists. These students will be notified of their finalist status well in advance of the meeting.

At EB, all undergraduate students will be invited to present their research posters not only during their regular scientific session but also at a special poster session to be held Sunday evening prior to the Bowditch Lecture. Earlier in the day, the 12–15 finalists will be asked to set up their posters in the same room. They will be

interviewed by the Award Committee in the afternoon. After the interviews, the Committee will decide the final awardees. The final awardees will be announced and will receive their certificates during the Sunday evening undergraduate poster session. Winners will also be announced at the APS Business Meeting on Tuesday evening.

Eligibility

Applicants for the David S. Bruce Award must: be enrolled as an undergraduate student at the time of the application and at the time of the EB meeting; be the first author on a submitted abstract for the EB meeting. Students may not submit more than one abstract for the award competition each year; be working with an APS member who attests that the student is deserving of the first authorship; have not previously won the David S. Bruce Award; and submit a one-page letter that discusses his/her role in the research, the significance of the research, and his/her career plans.

Review Criteria for Abstracts

Abstracts and student letters will serve as the basis for selection of the 12–15 finalists. Review criteria include the following (1): the abstract displays a clear logic and flow of ideas; the scientific problem includes a clear hypothesis to be tested, a well-described approach to the problem using clear experimental methods or model; the results of the study are presented succinctly; the discussion and/or conclusions are concise and follow logically from the results presented; the student's letter indicates that s/he played a significant role in the research, has an understanding of the significance of the research, and has some interest in a biomedical and/or physiology-related career.

Review Criteria for Poster Presentations

As noted above, the Award Committee will interview the 12–15 finalists during the special undergraduate poster session. Winners will be

selected from among the finalists. The Awards Committee will consider: quality of the poster and oral presentation; quality of graphics used; organization of the poster; creativity used in displaying and describing the research as well as in the development of the research project; novelty of the research project; student display of his/her understanding of the work and its significance.

Awards

Following the poster presentation, the Awards Committee will meet to make their final selections. The APS Council previously recommended that the total number of awards be not greater than 10% of the applicant pool, with a maximum of 4 awards annually. Each of the awards will include: \$500 travel award; award certificates for both finalists and awardees. Note: All undergraduates already are eligible for free registration to EB, therefore, registration is not part of the award.

Award Presentation

As noted earlier, the awards will be presented at the end of the Sunday evening undergraduate poster session and will be noted at the APS Business Meeting on Tuesday evening. Presentation of the awards during the weekend is important since most undergraduate students are unable to stay at the meeting until the Tuesday business meeting; most leave by Monday afternoon. Those who stay until Tuesday generally leave in the afternoon.

Award Program Evaluation

The student finalists and awardees will be contacted in subsequent years to both determine their career progress and to invite their continued participation in APS meetings and activities such as the Summer Research Program.

1. These criteria were modeled after those used for the Carolyn tum Suden/Frances A. Hellebrandt Awards. ❖

Summer Research Teachers and Research Hosts Honored at Luncheon

As the culminating activity of their 12-month fellowship, the 2004 Frontiers in Physiology and Explorations in Biomedicine summer Research Teachers (RTs) attended the 2005 International Union of Physiological Sciences (IUPS) meeting to learn about the latest science research findings, meet with physiologists, attend workshops and tour the posters and exhibits. Six of the twenty-five Research Teachers also presented posters about their summer research projects along with their research hosts and lab teams.

The 2004 Summer Research Teachers and their APS member Research Hosts were honored at a luncheon during IUPS 2005. Teachers received certificates of achievement for completing the 12-month fellowship and their Research Hosts were presented certificates of appreciation for their participation. **Robert Carroll**, Chair of the Education Committee, served as the master of ceremonies. President **Neil Granger** and Executive Director **Martin Frank** offered their congratulations while presenting certificates to the



Some of the 2004 Frontiers in Physiology and Explorations in Biomedicine research teachers at the IUPS luncheon in their honor.

teachers and their hosts. Also recognized were the six dedicated Mentor/Instructors, who, as former RTs, skillfully guided the 2004 Research Teachers through their fellowship year and the 2004 Physiologists-in-Residence, **Barbara E. Goodman**, University of South Dakota and **Karma Rabon-Stith**, University of Maryland at College Park.

Prior to the luncheon, the 2004

Research Teachers participated in “Models: Build It, Test It, Revise It, Test It Again,” a hands-on workshop exploring classroom labs that use model-building as a method of inquiry. **David Craymer**, Muskegon High School, Muskegon, MI, presented his “Studying Structure and Function Using Maple Seeds” lab. By tossing of maple seeds and folding paper, participants investigated the structure of maple samaras and the relation to seed dispersal. With her activity “How Do Paper Airplanes Fly?” **Angelica Alves**, West Ashley Intermediate School, Charleston, SC, helped attendees launch a study of forces and motions of objects through experimental design using paper airplanes. **Diana Hill** of Putnam City High School, Oklahoma City, OK, one of the Mentors for the 2004 RTs, led “Junkyard Digestion,” a hands-on exploration of the digestion system that included building a working model of the digestive tract and proved a nice lead-in to the celebratory luncheon.

The Frontiers in Physiology and Explorations in Biomedicine programs are designed to create ongoing rela-



Using plastic bags, pantyhose, Styrofoam bowls, a lot of duct tape and other materials, teams were challenged with building a model of digestive system that could “digest” peanut butter crackers.

tionships between research scientists and middle and high school teachers; and to promote the adoption of the National Science Education Standards for K-12 science content and pedagogical techniques among middle and high school teachers. The Explorations in Biomedicine project works intensively with the science faculty at schools and tribal colleges that serve Native American students to create an atmosphere that encourages science studies, and the exploration and pursuit of biomedical research careers.

The Summer Research program offers teachers nationwide a full-time, hands-on laboratory experience for 7-8 weeks at APS members' research labs. Teachers also attend a one-week workshop at the Airlie Center in Warrenton, VA, where they explore hands-on, inquiry based teaching strategies, consider classroom equity and technology-use issues, and begin to develop their own inquiry lab activities.

Frontiers in Physiology is sponsored by APS, the National Center for Research Resources (NCRR), Science Education Partnership Awards (SEPA), and the National Institute of Diabetes and Digestive and Kidney

Diseases (NIDDK) at the National Institutes of Health. The Explorations in Biomedicine program is supported by a grant from the National Institutes of Health, National Institute of General Medical Sciences (NIGMS Grant #GM08634), Minority

Access to Research Careers (MARC) Program.

More information about these programs is available on the APS website at http://www.the-aps.org/education/edu_k12.htm. ❖



Using plastic bags, pantyhose, Styrofoam bowls and a lot of duct tape, teams were challenged with building a model of digestive system that could “digest” peanut butter crackers. Here, Leone Rochelle (right) and Diana DeSpain (right), the activity facilitator, discuss possible modifications to the model while another team tests their model.



Workshop participants dropped maple seed samaras as part of their observations on structure and function.



Using plastic bags, pantyhose, Styrofoam bowls and a lot of duct tape, teams were challenged with building a model of digestive system that could “digest” peanut butter crackers.

Undergraduate Research Highlighted at IUPS/EB Meeting

For the second time at the International Union of Physiological Sciences/Experimental Biology meeting and as a result of the establishment of the David S. Bruce Awards for Excellence in Undergraduate Research, APS was pleased to host a special APS Undergraduate Poster Session to highlight the contributions of undergraduate researchers to physiology.

This special session was held in addition to the regularly scheduled poster session that the students were programmed into as part of the EB scientific program. It was held Saturday after-

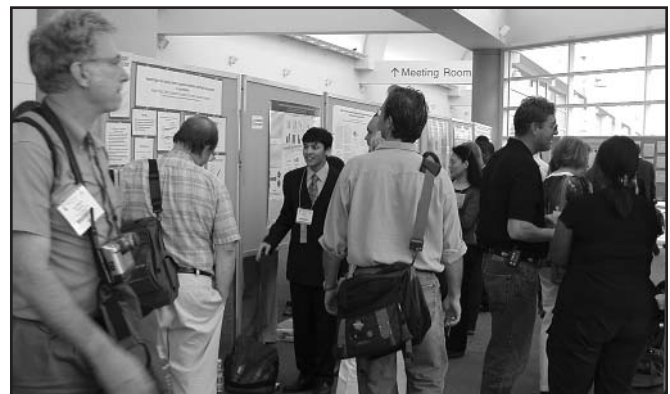
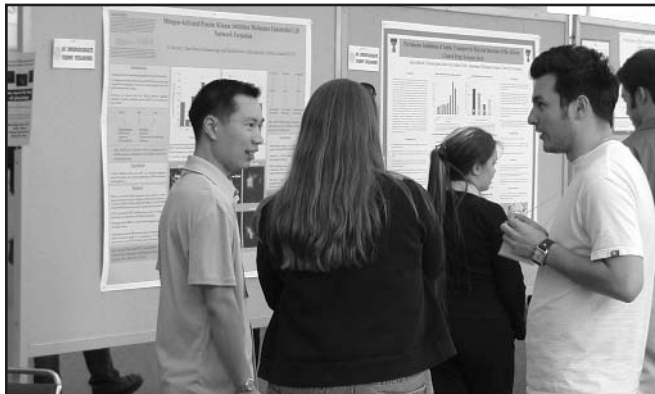
noon of the IUPS/EB meeting and culminated in the presentation of the David Bruce Awards.

Of the 123 undergraduate first authors invited to present at the APS Undergraduate Poster Session, 97 came to the session and had the opportunity to put up their poster and present it to interested scientists and guests. The session not only provided the undergraduate students with an opportunity to highlight their research but also to meet faculty from many graduate schools and medical schools to discuss their future plans. Approximately 200 APS members

and guests were in attendance at the session, with many comments heard as to the high quality of research being presented by the students. This year, for the first time, the students and their research were highlighted in a special program given out for the session.

APS looks forward to hosting APS Undergraduate Poster Sessions at future Experimental Biology meetings and encourages APS members to have their undergraduate students to submit abstracts for EB, apply for the David Bruce award, and attend the poster session in 2006. ❖

Highlights from the APS Undergraduate Poster Session at IUPS/EB Meeting



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; Tel: 301-634-7165; Fax: 301-634-7241).



The Environmental and Exercise Physiology Section Awardees at IUPS 2005 included the following predoctoral students: Jessica Taylor, Damian Dyckman, Jordan Miller, David Brown, and Steven Bloomer.



The Endocrinology & Metabolism Physiology Section Awardees at IUPS 2005 included the following: (back row) Naibedya Chattopadhyay, Brian Krawiec, Christos Katsanos, Patric Fueger; (front row) Michella Coelho, Bing Shen, Melanie Cree, Satoshi Fugita.



The Environmental and Exercise Physiology Section Awardees at IUPS 2005 included the following postdoctoral students: Tarek Mousa, Alexandre Steiner, Shizue Masuki, David Wright, and Jeffrey Otis.

Introducing Hannah V. Carey

On January 1, 2005 **Hannah V. Carey** succeeded **Andrea Gwosdow** as Chair of the Communications Committee. Prior to becoming Chair, Carey was a Communications Committee member and served previously as Chair of the Task Force on Communications that led to the establishment of the Committee in 2002. She has participated in APS activities since joining the Society as a postdoctoral fellow in 1984. Carey was a member and Chair of several APS committees including the Women in Physiology Committee; Membership Committee; Gastrointestinal and Liver Section Steering Committee; the Committee on Committees; and the FASEB Excellence in Science Committee. She served a three-year term on APS Council from 1999–2002, and was a member of the US Scientific Programming Committee for the 2005 IUPS Congress.

Carey has served on the editorial boards of *AJP: Regulatory, Integrative and Comparative Physiology*, *Physiological Biochemistry and Physiology*, and is currently a member of the editorial board of *AJP: Gastrointestinal and Liver Physiology*. She is an Editor of the *Journal of Comparative Physiology B*, and a member of the Faculty of 1000 for Gastrointestinal Physiology. Carey has also been active in the American Gastroenterological Association including a recent four-year term on the AGA Council, representing the Nutrition and Obesity Section.

Carey is a Professor in the Department of Comparative Biosciences in the School of Veterinary Medicine at the University of Wisconsin, Madison. She received her BS from the State University of New York at Binghamton and completed her PhD at the University of California, Davis in 1983. Carey did postdoctoral training with Helen Cooke, first in the Physiology Department at the University of Nevada, Reno and subsequently at Ohio State University. Carey credits Cooke with providing the excellent mentorship that influenced her professional life as a physiologist, including being an active member of the APS. After a stint as Research Assistant Professor at Ohio State she joined the



Hannah V. Carey

University of Wisconsin in 1989 as Assistant Professor, and moved through the rank of Associate Professor (1995) to achieve her current position as Professor (2001). She is also an affiliate member of the University of Wisconsin Departments of Nutritional Sciences and Pediatrics.

Carey conducts research in gastrointestinal physiology and hibernation biology. Identification of mechanisms by which the gut responds to normal physiological change, as well as pathophysiological states, is a major focus for both research areas. One line of research has used piglets as a model for understanding processes of intestinal absorption and secretion in mammalian neonates, including the effects of feeding and fasting on intestinal structure and function, and the role of insulin-like growth factor in intestinal adaptation. Carey is particularly passionate about her work in hibernation biology, which she has pursued since graduate school. Her laboratory has made important contributions to the understanding of gastrointestinal and nutritional physiology of hibernating mammals. Along with her students and collaborators, Carey examines how the intestine responds to the nutritional, metabolic and circulatory changes associated with hibernation, including effects on mucosal structure and function, gene expression, enterocyte proliferation and apoptosis, and the mucosal immune system. Results of these studies are revealing mechanisms that

hibernators use to protect the gut from the physiological extremes associated with torpor-arousal cycles. In recent years Carey has helped pioneer the use of hibernators as models for endogenous protection against stress and trauma states. Her laboratory is currently working towards translating insights from the hibernation phenotype to novel approaches to improve survival after trauma states including organ preservation, intestinal ischemia-reperfusion and hemorrhagic shock. Carey has received research funding from several sources including the NIH, NSF, USDA, the US Army Research Office and the Defense Advanced Research Projects Agency.

Carey has had a long-standing interest in promoting biomedical science and physiology at the local, state and national levels. She has served on the Board of Directors of the Wisconsin Association for Biomedical Research and Education (WABRE) since 1995, and began a term as President of WABRE in January 2005. She has engaged in science-related outreach presentations to grade school and senior citizens groups as well as local community organizations and the media. Thus, her new position as Chair of the Communications Committee is a natural extension of these interests. During her tenure as Chair, Carey's goals for the Committee are to strengthen existing programs and develop new initiatives to fulfill the Committee's mission of enhancing the visibility of the physiological sciences and the APS to the public. She will help guide Committee activities that support the in-house Communications Office, which is actively working to focus attention on Society programs, the research accomplishments of APS members and the science produced through APS journals and meetings.

Carey notes that increasing the public's awareness of the discipline of physiology is an activity in which all APS members can participate, and that even small contributions to this effort can together make a difference to the overall mission. She invites members to work with the Committee and the Communications Office to promote their own work and the discipline of physiology to the public. ❖

New Regular Members

*transferred from Student Membership

- Nadia A. Ameen**
Univ. of Pittsburgh Sch. of Med., PA
- Frank Baas**
Academic Med. Ctr., The Netherlands
- Emilio Badoer**
RMIT Univ., Australia
- Franco Capozza**
Albert Einstein College of Med., NY
- Christopher J. Charles**
Christchurch Sch. Med. Hlth. Scis.,
New Zealand
- Mark Cline**
Radford Univ., VA
- Cihan Demirci**
Istanbul Univ., Turkey
- Hagit Eldar-Finkelman**
Tel Aviv Univ., Israel
- Michael J. Eppihimer**
Pennsylvania State Univ.
- Ersin Fadillioglu**
Med. Fac. of Inonu Univ., Turkey
- Catherine Gabaree-Boulant**
Capital Univ., OH
- Zhaohui Gao**
Penn State Coll. Med., Hershey
- Federico V. Grossi**
Univ. of Louisville, KY
- Chetan P. Hans**
Mississippi State Univ.
- Yuichi Ishibe**
Tottori Univ. Fac. Med., Japan
- Jian Kang**
New York Med. College
- Gregory G. King**
Royal North Shore Hosp., Australia
- Jiri Kofranek**
Charles Univ. Prague, Czech Republic
- William B. Kristan**
Univ. of California, San Diego
- Claudio E. Lagoa**
Univ. of Pittsburgh, PA
- George P.H. Leung**
Univ. of Hong Kong
- Chuanfu Li**
East Tennessee State Univ.
- Jia Hai Lu**
Sun Yat-sen Univ., China
- Bryce MacIver**
Univ. of Pittsburgh, PA
- Scott A. Mazzetti***
Anderson Univ., IN
- Nael A. McCarty***
Georgia Inst. of Technology
- David A. McCrea**
Univ. of Manitoba, Canada
- Julie E. McMinn***
Columbia Univ., NY
- Harihara M. Mehendale**
Univ. of Louisiana, Monroe
- Natalie Jane Miller**
Inst. of Med. and Vet Science,
Australia
- Xie Ming**
Beijing Univ. of Chinese Med., China
- Tarek M. Mousa**
Univ. of Nebraska Med. Ctr.
- Sacha B. Nelson**
Brandeis Univ., MA
- Minhtri K. Nguyen**
Univ. of California, Los Angeles
- Barbara Ann Parker**
Univ. of South Australia, Australia
- Tatiana Pasternak**
Univ. of Rochester Med. Ctr., NY
- Stephen F. Previs**
Case Western Reserve Univ., OH
- Peter M. Price**
Univ. of Arkansas Med. Scis.
- Randall L Rasmusson**
State Univ. of New York, Buffalo
- Claus-Peter Richter**
Northwestern Univ., IL
- Emily Catherine Rothstein***
NIH, MD
- Qingmin Ruan**
Univ. of Alabama, Birmingham
- Rashmin C. Savani**
Children's Hospital, Philadelphia, PA
- Thomas H. Schindler**
Univ. of California, Los Angeles
- Mark J. Schnitzer**
Stanford Univ., CA
- Robert K. Shepherd**
Univ. of Melbourne, The Bionic Ear
Inst., Australia
- Frances K. Skinner**
Toronto Western Res. Inst., Canada
- Terry Russell Smith**
Mississippi State Univ.
- Matthew L. Springer**
Univ. of California, San Francisco
- Christianne E. Strang**
Univ. of Alabama, Birmingham
- Bunyen Teng**
East Carolina Univ., NC
- Kimimasa Tobita**
Children's Hospital, Pittsburgh, PA
- Gleb P. Tolstykh**
Univ. of Texas, San Antonio
- Philip A. Veillette**
Univ. of Rhode Island
- Guoping Wang**
Tongji Med. College Huazhong
Univ., China
- Louise B. Weschler**
Private Research, Colts Neck, NJ
- Theodor A. Zainal**
Jemsek Clinic Prof. Assoc., NC
- Weirong Zhang**
Univ. of Texas, San Antonio
- Xiaohui Zhang***
Harvard Medical School, MA

New Student Members

- Ali Abedi**
Texas State Univ.
- Peter Allen**
Univ. of California, Davis
- Fatemeh Askarian**
Azad Univ. Sci. & Res. Branch, Iran
- Oyebisi Azeez**
College of Med. of the Univ. of Nigeria
- Alayna Banach**
Brock Univ., Canada
- Andreas Beyer**
Univ. of Iowa
- Bill Campbell**
Baylor Univ., TX
- Maile Ceridon**
Mayo Clinic, MN
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- Jenny Chiu**
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- Marlene Guillon**
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- Sara Jarvis**
Pennsylvania State Univ.
- Kuljeet Kaur**
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- Il-Young Kim**
Univ. of Texas, Austin
- Tina Lam**
Univ. of California, Davis
- Matthew Laye**
Univ. of Missouri, Columbia
- David Moorman**
Univ. of Pittsburgh, PA
- Vivian Pam**
Univ. of Jos, Nigeria

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Akhmad Rahadi

Univ. of Airlangga, Indonesia

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Univ. of Missouri, Columbia

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Liggins Inst. of Res., New Zealand

Jennifer Rutkowski

Univ. of California, Davis

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Univ. of Louisville, KY

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Education

Resource Website Created for Medical Physiology Course Directors

The APS Education Committee in conjunction with Association of Chairs of Departments of Physiology (ACDP) has developed a new website to bring together key resources to assist course directors in the development and conduct of medical physiology courses.

The website will include resources in 10 major areas:

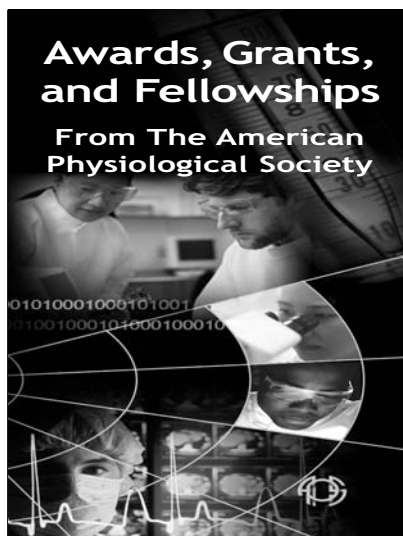
- Course Administration
- Medical Physiology Learning Objectives
- Teaching Methods and Materials
- Content Resources
- Assessment of Students
- Evaluation of Course
- Curriculum Design
- Course Director Roster
- Educational Meetings & Conferences
- Faculty Development Resources

Before the site can go live, however, additional materials are needed to enrich the pages. For a list of materials that are needed, please contact Melinda Lowy in the APS Education Office (mlowy@the-aps.org). Anyone with material that they are willing to share can send the actual documents or appropriate link to Rob Carroll (carrollr@mail.ecu.edu) or Melinda Lowy at APS (mlowy@the-aps.org). If someone is willing to share but does not want the material freely available to members, contact information can be put up in its place on the web site.

The web site structure was developed by a working group that included both APS and ACDP members. APS members included Rob Carroll (APS Education Com. Chair, East Carolina Univ.), Martha Blair (University of Rochester Med. Center), Jeffrey

Freedman (SUNY Upstate), and Thomas Schmidt (Univ. of Iowa). ACDP members were Mike White (Drexel Univ.), Robert Gunn (Emory Univ.), and Robert Blair (Oklahoma University for Robert Foreman). The group met via email and conference call to develop a detailed listing of topics that should be included in a resource website for medical physiology course directors.

APS already provides continuing education resources, such as the EB Refresher Courses (and related *Advances in Physiology Education* articles), peer-reviewed teaching materials via both *Advances* and the APS Archive of Teaching Resources digital library and, in conjunction with the ACDP, developed the *Medical Physiology Learning Objectives*. ❖



The American Physiological Society (APS) provides leadership in the life sciences by promoting excellence and innovation in physiological research and education and by providing information to the scientific community and to the public.

The Awards, Grants, and Fellowships programs are designed to strengthen and shape the discipline through awards that support, recognize, and publicize the scholarly and research activities of APS Members.

For Full Details or Questions

...on all awards, grants and fellowships listed in this brochure, visit the APS web site at:

www.the-aps.org/awards

APS Presents Awards to Outstanding High School Students at the 56th Annual International Science and Engineering Fair

The 56th Annual International Science and Engineering Fair (ISEF) was held in Phoenix, AZ May 8-14, 2005. Over 1,400 students from more than 40 nations spent seven days talking science and competing for scholarships, tuition grants, internships, scientific field trips and the grand prizes: two \$50,000 college scholarships sponsored by Intel and Ricoh. Grand Awards in each of 14 categories ranging from \$500 to \$5000 were presented by the Intel Foundation, Ricoh, Shell Oil and Merck. Special Awards were given by 86 scientific, professional, industrial, educational, and governmental organizations in the form of scholarships, tuition grants, summer internships, trips, and equipment grants. For the 13th year, the APS presented four Special Awards in the form of cash prizes, certificates and student subscriptions for the best projects in the physiological sciences. This year's APS judging team was **Nancy L. Kanagy** from the University of New Mexico School of Medicine who acted as lead judge and fellow judges **Cynthia Standley**, **Layla Al-Nakkash** and **Michael Quinlan**, all from Midwestern University.

The city of Phoenix bristled with energy as more than 1,400 eager young scientists accompanied by teachers, parents and other well-wishers crowded into the Phoenix Civic Center. During the week leading up to the final awards ceremonies, students

were interviewed multiple times by judges and treated to an opening ceremony with Mariachi dancers and Spirit dancers and participated in a panel discussion featuring seven Nobel Laureates. The Convention Center floor was humming with many languages and bright with national costumes from around the world as these scientists of the future discussed serious science. As judges, we sorted through many remarkable projects to select sixteen that best fit the category of "physiology". We interviewed each of these finalists to determine their participation in the study and to evaluate their understanding of the science and experimental design behind the project. After a grueling day of interviews, we chose the following projects to receive APS awards for excellence in physiological research.

Receiving \$1000 and first place was **Sarah S. Mousa** from Columbia High School in East Greenbush, New York for her project titled "Implications of Nicotine's Pro-angiogenesis Activity: the Good and the Bad." In this project, 17-year-old Sarah used a chick egg angiogenesis model and cultured epithelial cells to examine growth-promoting effects of nicotine. This research is currently the basis of a patent application for the use of nicotine "band-aids" to facilitate wound healing.

Yahya Maqsood Mohammed from Alkalize-Walton CC Charter

High School in Niceville, FL received \$500 and second place for his project titled "Ascorbic acid induced enhancement of laminin in Schwann cells: application for peripheral nerve regeneration." This entry in the Biochemistry category treated cultured Schwann cells with different concentrations of ascorbic acid and examined production of laminin. This polite 16-year-old scientist described an extensive series of studies conducted to evaluate the potential beneficial effects of ascorbate on laminin production as possible adjunct therapy for neural regeneration.

For the two third place projects, the APS judging team chose **Ketaki Rawal** from Centennial Regional High School in Greenfield Park, Quebec, Canada for her project titled "Saliva, the Stress Code." and a team project by **Lauren Nicole Toub** and **Anjuli Patricia Kannan** from Yorktown High School in Yorktown Heights, New York for their project titled "The Possible Role of Bone Morphogenetic Protein in the Effect of the Choroid Plexus on Cortical Neurons." These young researchers received certificates and a \$500 award. Katak Rawal's project used a public speaking stressor to examine the effect of stress on the level of corticosteroids in saliva. She observed differences in gender responses and a significant correlation between stress and steroid levels sug-

(continued on page 204)



ISEF student awardess: Yahya Mohammed, Lauren Toub, Anjuli Kannan, Ketaki Rawal, Sarah Mousa, and APS lead judge Nancy Kanagy.



APS ISEF judging team: Cynthia Standley, Michael Quinlan, Nancy Kanagy and Layla Al-Nakkash.

(continued from page 203)

gesting that this might be a potential non-invasive method of screening for stress. The team of Lauren Toub and Anjali Kannan used cultured cortical neurons to examine the effect of chorioid plexus tissue on the neural growth. They observed that choroids plexus explants increased the rate of growth of the neurons and hypothesized that specific neurotrophic factors might be released from the tissue to stimulate the growth.

In addition to the five APS Special Awards winners, the APS also recognized nine other students in the form of a one-year subscription to *Physiology*. These outstanding science students were: **Sami Obaid**, a junior from College Regina Assumpta in Montreal, Quebec, Canada (“Dopaminergic Neurons from Bone Marrow Cells: An Acceptable, Potential Therapy for Parkinson’s Disease”); **Parth Vyas**, an 11th grader from William L. Dickinson High

School in Jersey City, NJ (“Effects of Kava and Alcohol on Heart Rate Variability of *Daphnia magna*”); the team of **Morgan Rummel** and **Holly Wonders**, from Delavan High School in Delavan, IL (“The Effects of Cinnamon on Factors Affecting Cardiovascular Disease”); **Lindsay MacLeod**, a senior at Suffern High School in Suffern, NY (“The Effects of Ipriflavone on Human Osteoclastic Bone Resorption and Cell Morphology *in vitro*”); **Allison Rhines**, an 11th grader at Oregon Episcopal School in Portland, OR (“An Analysis of Brain Tissue Sections for Proteins Targeted by the Genotoxicant Methylazoxymethanol (MAM)”); **Diana Eheart**, a senior at Hamilton High School in Chandler, AZ (“Therapeutic Efficacy of Serotonin Precursor Loading to Mitigate MDMA-Induced Neurotoxicity: Rescue of Serotonin Neurons and Treatment of Anxiogenesis”); Katherine Nicholas, a junior at Ephrata Senior High School,

Ephrata, PA (“The Effects of Betaseron and Pycnogenol on Nitric Oxide Levels in Multiple Sclerosis Cells”); and **Valerie Brak**, an 11th grade student at Navasota High School in Navasota, TX (“The A”maze”ing Sleep Deprived Mice: A Study of the Effects of Sleep Deprivation”)

These projects are just a sampling of the many outstanding projects we had the opportunity to review. All of the 1,443 finalists at the ISEF were bright, enthusiastic, and diverse. Their projects ranged from examination of the effect of cinnamon capsules on diabetes to the design of prosthetic limbs. The Intel International Science and Engineering Fair is a wonderful event and I was proud to represent APS at this celebration of the scientists of tomorrow. ❖

N.L. Kanagy,
APS Education Committee

Physiologists Support Indian School

In December 2004 approximately 60 physiologists, almost all members of the American Physiological Society, convened a conference on the long-term control of blood pressure at the Samode Palace in the village of Samode, approximately 40 miles from the Rajasthan city of Jaipur in India. The four-day meeting covered various aspects of blood pressure regulation including neural regulation and renal mechanisms. The meeting was organized by Simon Malpas of the University of Auckland and Roger Evans of Monash University. The total attendance including spouses and guests was approximately 100.

While the scientific component of this meeting was outstanding, there were additional benefits and outcomes, which may have a longer lasting impact. Many of the spouses attending this conference took a tour of the village of Samode and observed the educational facilities in several primary schools. Because the students in the Government Primary School were without essential facilities such as desks, chairs, writing materials,

etc., Clive May of the Howard Florey Institute and his wife Susie May initiated a plan to provide the students with some of these necessities. A collection was taken up from all participants. Approximately \$1,200 was raised. This was enough money to provide furniture, whitewashing of the walls and electricity. This was the first such charitable donation from a group of physiologists. The organizers and participants are grateful to Susie May for organizing this effort. ❖

Before renovations students had no furniture (top). Following renovations made possible from physiologists attending a blood pressure conference in Samode, India classrooms were bright and colorful with adequate desks and chairs (right).



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

Capillary Pressure (simulation)

A. Shepherd

Cardiovascular Interactions: A Major Revision of Mating an Interactive Lab Book and a Mathematical Model (simulation)

Carl F. Rothe

Pathophysiology and Treatment of Sarin (anti-cholinesterase) Poisoning (multimedia presentation)

Beth A Habecker

In addition, the *Essays on APS Classic Papers* listed below and the Classic Papers themselves, which were published by APS, have been catalogued in the Archive.

Adrenal cortex: scalpels, syringes, and separatory funnels

Susan F. Akana

Berne's adenosine hypothesis of coronary blood flow control

Eric O. Feigl

Acute hypoxia and pulmonary vasoconstriction in humans: uncovering the mechanism of the pressor response

Alfred P. Fishman

Two classic papers in acid-base physiology: contributions of R. F. Pitts, R. S. Alexander, and W. D. Lotspeich

Gerhard Giebisch

Discovery of the luteinizing hormone of the anterior pituitary gland

H. Maurice Goodman

The pioneering use of systems analysis to study cardiac output regulation

John E. Hall

Ca-induced Ca release: lessons regarding cell models

David R. Harder

The development of clearance methods for measurement of glomerular filtration and tubular reabsorption

T. H. Hostetter and T.W. Meyer

Nature vs. nurture: can exercise really alter fiber type composition in human skeletal muscle?

Christopher P. Ingalls

Hypothalamic control of body temperature: insights from the past

Gary W. Mack

Microvascular permeability, ultrafiltration, and restricted diffusion

C. C. Michel

Stresses on pulmonary blood vessels

Wayne Mitzner

The basis for transport across epithelial cells

Marshall H. Montrose

Comroe's study of aortic chemoreceptors: a path well chosen

Judith A. Neubauer

The significance of the blood gas analyzer

Hershel Raff

Discovering the role of the adrenal gland in the control of body function

David C. Randall

Eugene M. Landis and the physiology of the microcirculation

E. M. Renkin

Micropuncture: unlocking the secrets of renal function

Jeff M. Sands

Experimental validation of the countercurrent model of urinary concentration

James A. Schafer

First electrodes for blood P_{O_2} and P_{CO_2} determination

John W. Severinghaus

Anterior pituitary hormones: development of a bioassay leading to the discovery of prolactin

M. Susan Smith

The paper that completely altered our thinking about cerebral blood flow measurement

Richard J. Traystman

Understanding pulmonary gas exchange: ventilation-perfusion relationships

John B. West

Using Animals in Teaching: APS Position Statement and Rationale

Robert G. Carroll, East Carolina School of Medicine

Rationale

The 2004 APS Position Statement on the Use of Animals in Teaching evolved following more than two years of discussions within the Council, the Animal Care and Experimentation Committee, the Education Committee, and the Editorial Board of the journal, *Advances in Physiology Education*. Position statements are, by definition, brief, and typically do not capture the detailed analysis and discussion of the complex issues that they summarize. Therefore, it is important to provide additional information to help orient the reader to the discussion that shaped the position statement. Toward that end, the APS is providing two background information pieces. The first is a historical perspectives review on the use of animals in teaching laboratories by APS Public Affairs Officer, Alice Ra'anan, available in the September 2005 issue of *Advances in Physiology Education* (8). The second is an educational rationale for the use of animal laboratories in the larger context of student laboratories.

Active learning approaches such as student laboratories are often costly in terms of time and resources. Educators must be able to explain clearly to administrators and to students the benefits obtained from laboratory experiences in the context of the educational goals for the course. The following rationale provides an overview of the benefits and considerations in selecting teaching laboratory activities (as distinct from activities in the lecture hall or in the research laboratory).

Selecting Pedagogy to Promote Learning

Learning is more than the acquisition of facts. Students, particularly in the sciences, need to be able to think critically, to analyze information, and to apply information and solve problems. These skills are characteristics of the higher cognitive domains in the taxonomy proposed by Bloom. Educational research shows clearly that active learning experiences such as student laboratories help develop higher cognitive skills (6). As one APS

committee member observed during the development of the position statement, "You think you understand something until you experience it."

Instructional activities involving student-centered laboratories and lessons add important dimensions to the learning process. Laboratory activities allow the instructor to include a higher percentage of learning styles amongst students and thereby provide a much more meaningful and successful learning experience. A wealth of reports and research summaries over the past 20 years emphasize the importance of laboratory-based experiences in the development of both science content understanding and science process skills (6, 10, 9, 3, 7). The National Research Council's Commission on Life Sciences pointed out that, in biology, laboratory investigations serve crucial functions, including:

challenging students' beliefs about the natural world and leading them to learn how to present scientific concepts accurately in their own words;

enabling students to generate knowledge directly from natural phenomena and learning how such knowledge can become reliable knowledge;

developing deep understanding of organisms and their environments through hands-on experience;

helping students to learn about precision and accuracy in observations, measurement, record-keeping, and inferring as well as developing skills in problem-solving; and

building student skills in using technology in the quest for new knowledge (5, p. 35).

Therefore, life science educators are well-justified in seeking to enrich the learning experiences of their students through laboratory exercises, despite

APS Position Statement on the Use of Animals in Teaching Adopted by the APS Council, November 2004

The study of living systems is an essential component of physiology instruction. Teaching laboratories that actively engage students in observation of and interaction with living systems enhance student understanding of physiology, providing experiences that are qualitatively and quantitatively different from those gained through lecture, small group discussion, or multimedia presentations. In addition, the active participation and discovery learning opportunities provided by teaching laboratories allow students to hone independent and life-long learning skills such as analytical and problem solving skills. The hands-on approach used in laboratories offers active learning opportunities for all students, whether they are strong visual, auditory, or kinesthetic learners. These advantages significantly outweigh the drawbacks of limited curricular time and facilities as well as potentially greater costs and increased resources required for regulatory compliance for laboratories involving human or animal subjects. Whether working individually or

in groups, well-designed animal laboratories provide vivid, exciting opportunities for the direct study of how living systems work. Not only do these lessons foster active learning and the development of critical thinking skills in students, but they provide a unique opportunity for students to develop a lasting appreciation of the complexity of living systems and an abiding respect for living organisms. Animal laboratories should be offered for valid educational reasons, where the use of the laboratory builds important knowledge, skills, and/or attitudes. Instructors who incorporate animal laboratories into their course or curriculum must insure that the students are appropriately prepared for the experience and that the laboratory is conducted humanely. The American Physiological Society is committed to the continuing development of resources that enhance the student laboratory experience for all types of learners. A description of various laboratory options is included in the rationale document supporting this position statement.

the increased costs and preparation of laboratory-based lessons. As stated in "How People Learn," "The expense of the laboratories is justified by the qualitatively different experience made possible when the boundaries of an idea can be tested or worked with in a laboratory or field-based setting" (1).

Diverse Lab Experiences Enrich the Curriculum

Effective science teaching requires a diversity of strategies and approaches (6). Diversifying the types of learning experiences and even the types of laboratory experiences in a course helps engage a larger number of students. Research has clearly shown that:

- students exhibit a variety of learning styles and characteristics;
- their preferences for learning styles can range from mild to strong;
- their cognitive preferences can affect their performance in different subject areas; and
- students whose learning style is complementary to the instructor's teaching style often receive higher grades (12).

The three most common characterizations of learning styles are: 1) visual, auditory, read/write, and kinesthetic (VARK) (8) Carl Jung and Myers Briggs Type Indicator (BMTI) (2), and 3) Howard Gardner's Multiple Intelligences (4). Despite their differences in measurement methods, each of these characterizations have demonstrated the importance of creating an environment rich with different types of learning experiences.

What types of laboratory-based experiences make positive contributions to student learning? The majority of life science laboratory-based experiences can be grouped into those not involving living tissue (simulations, physical models, preserved specimen tissue) and those that do involve living tissue (human subjects, animal subjects, and plants). As with all educational strategies, there are advantages and disadvantages associated with each approach. It is important to realize that this is not an "either-or" decision. Some educational goals are best accomplished by inanimate laboratories, others by the study of living systems. Some of the considerations that instructors may want to consider are listed below for a variety laboratory options.

Inanimate Options

Computer simulations, physical models, virtual reality, and other technological innovations are promising in terms of their ability to impart knowledge and provide skills training. Instructors should periodically review new developments in this rapidly changing area, and consider how these materials can be used to meet the educational goals of their course.

Simulations: Mathematical modeling of physiological systems provides a powerful tool for both teaching and for research. A very basic algorithm of the cardiovascular system allows students to interact and observe the consequences of changing variables such as peripheral resistance or circulating blood volume. Such a model can grow in complexity as our understanding of the interaction between physiological processes increases. Another advantage of simulations is their independence from time. These experiments can be reset and re-run, allowing multiple interventions in a limited period. Improvements in the graphical outputs of these models make them more attractive to learners, and evaluation of select learning outcomes confirms that simulations can provide a useful educational experience. Simulations and models, however, are by their nature approximations of a living system. The complexity and unpredictability of living systems is difficult to capture, even in the most complex simulation (video games vs. reality).

Physical models: Physical models provide an opportunity for hands-on exploration. Models may be designed to allow learners to explore underlying principles, such as the relationships between flow, resistance and a pressure gradient. Often, experimental study of these relationships cannot be easily achieved in living systems. Models such as manikins are increasing in complexity, and are useful for skills training, such as cardiopulmonary resuscitation (CPR). The weakness of models is similar to that for simulations. At best, models are an approximation of a living system.

Preserved specimen tissue: Preserved tissues provide an opportunity for learners to explore structural relationships. Preserved specimens

are anatomically correct, and if multiple samples are used, can be used to illustrate biological variation. For physiology, preserved tissues are static, and do not allow study of time-dependent events.

Animate Options

Instruction involving living organisms makes a unique contribution to life sciences education by providing students with a direct understanding of how living systems work. The use of animals gives students a direct understanding of how living systems work. This produces insights that are qualitatively different from those that can be obtained by reading a textbook, watching a video, using a computer, or experimenting with inanimate models.

Students in the life sciences should be given appropriate opportunities to work directly with living systems, but educators in the life sciences should give careful consideration as to whether this mode of instruction is appropriate for their students. Issues that should be taken into account should include the educational objectives of a specific course within the broader program of study; the knowledge base, prior experience, and maturity of the students; and whether humane handling of the animals and an appropriate instructional environment for the students can be insured.

Live tissue: Laboratory experiments can utilize living tissue rather than an intact organism. For example, the chicken egg membrane and the red blood cell provide an excellent model mechanism for study of osmosis and membrane transport.

Animal Laboratories-Humans: Students in the life sciences often pursue careers in health and medical professions, and are most interested in human physiology. A number of commercial companies provide equipment and sample experiments where students serve as the laboratory subject. These non-invasive experiments use advances in technology to measure variables that previously were only available through invasive approaches. In addition to the regulations involving other animals, instructors must be sure that human subject laboratories comply with extensive regulatory guidelines, which in the USA

now include HIPPA.

Animal Laboratories—Other

Mammals: Animal laboratories allow students to perform both observational and/or invasive study of living systems. Animal laboratories provide experiential opportunities that cannot be obtained in other settings, such as observing cardiac contraction and ventricular fibrillation. Animal experiments involve a significant emotional experience that enhances learning. Such experiments illustrate intrinsic variability and unpredictability, and facilitate discussions of heterogeneity and functional variability. As with human experiments, instructors opting to use animal experiments must insure compliance with IACUC and other regulations.

Animal Laboratories—Other

Vertebrates: The educational goal of the laboratory is sometimes best accomplished by selecting non-mammalian, experimental subjects such as frogs or fish. The diversity of biological systems provides opportunities for students to gain an appreciation of the comparative anatomy and physiology of a variety of living systems while allowing the instructor to select from animal models that fit the lesson objectives, available equipment and lesson time, and costs. As above, instructors must insure compliance with IACUC and other regulations, where applicable.

Animal Laboratories—Invertebrates:

Invertebrates exhibit a huge diversity in physiological processes that should be considered when designing student laboratories. Invertebrates provide excellent opportunities for student laboratories examining, for example, thermoregulation or the transmission of genetic traits. Although invertebrates are not covered by USDA or IACUC, use of any living system must follow ethical guidelines.

Animal Use Ethics

The use of animals in student laboratories provides an opportunity to open a discussion of the ethics of animal use in our society. It is important to provide the opportunity for students to consider their attitudes toward the use of animals in research, for clothing, for food, and as pets.

These are important ethical issues. This discussion also provides an opportunity to draw a clear distinction between animal welfare groups and the animal rights groups.

Summary

The study of living systems is an essential component of physiology instruction. The American Physiological Society is committed to the continuing development of resources that enhance the student laboratory learning experience. Teaching laboratories provide unique opportunities for active participation, discovery learning, and development of team skills.

Physiology educators have a long tradition of developing and evaluating the effectiveness of novel educational tools. The APS publishes a journal with that specific focus, *Advances in Physiology Education*. The evaluation of the learning process is essential to good teaching, and insures that the focus remains on providing educational experiences that enhance student learning. To assist in the evaluation and selection process, the APS has developed a listing of resources on the options above. http://www.the-aps.org/education/edu_teachingres.html.

When selecting laboratories that do and do not use living organisms, instructors must bear in mind that students may differ in their educational preferences; that is, some students may be uncomfortable with instructional activities involving animals while others find these activities inspiring and particularly beneficial. The same students also differ in their educational needs; diverse student learning styles call for diversity of learning experiences. In many cases, hands-on experience with living systems may be the ideal learning experience for a student and, in an educational setting that is becoming increasingly dependent upon print and multi-media images, may become a critical experience for students who need tactile experiences to enhance their learning.

These advantages significantly outweigh the drawbacks of limited curricular time, limited facilities, costs, and the need for regulatory compliance for laboratories involving human or animal subjects. In the final analysis, the

only way to truly understand living systems is to experience living systems. ❖

References

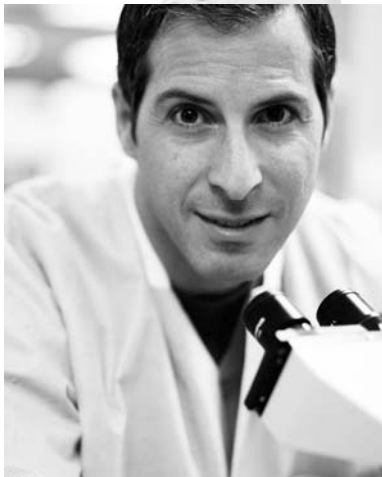
1. Bransford, JD, Brown, AL, Cocking, RR, Donovan, MS, and Pellegrino, JW (editors). *How People Learn: Brain, Mind, Experience, and School—Expanded Edition*. Washington, DC: National Academy Press.
2. Center for Applications of Psychological Type (http://www.capt.org/The_MBTI_Instrument/Home.cfm).
3. Clewell, BC, Anderson, BT, & Thorpe, ME. *Breaking the Barriers: Helping Female and Minority Students Succeed in Mathematics and Science*. San Francisco: Jossey-Bass.
4. Gardner, H. *Intelligence Reframed: Multiple Intelligences for the 21st century*. New York: Basic Books, 1999.
5. National Research Council (NRC). *Fulfilling the Promise: Biology in the Nation's Schools*. Washington, DC: National Academy Press, 1990.
6. National Research Council (NRC). *Inquiry and the National Science Education Standards*. Washington, DC: National Academy Press, 2000.
7. National Research Council (NRC). *National Science Education Standards*. Washington, DC: National Academy Press.
8. Ra'anan, A.W. The evolving role of animal laboratories in physiology instruction. *Advances in Physiology Education*, in press.
9. Siebert, ED and McIntosh, WJ. *College Pathways to the Science Education Standards*. Arlington, VA: NSTA Press, 2001.
10. US Congress, Office of Technology Assessment. *Educating Scientists and Engineers: Grade School to Grad School*, OTA-SET-377. U.S. Government Printing Office: Washington, DC, 1998.
11. VARK—A Guide to Learning Styles (<http://www.vark-learn.com/english/index.asp>)
11. Washington University of St. Louis, Cornerstone-The Center for Advanced Learning. *Learning Styles Assessment*. <http://cornerstone.wustl.edu/learningstyles.htm>].



THE AMERICAN PHYSIOLOGICAL SOCIETY

Fact Sheet

Membership Benefits



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- ✓ Archive of Teaching Resources
- ✓ Expanded mentoring program for trainees
- ✓ Public Affairs resources—for instance, *Interactive Legislative Action Center*, and information about research funding and animals in research



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House Passes Stem Cell Research Bill

On May 24, 2005, the House of Representatives voted 238-194 to pass H.R. 810, the Stem Cell Research Enhancement Act. This bill would go beyond the limited policy put into effect by the Bush administration in August of 2001 and allow federal funds to be spent on research using new stem cell lines. However, this bill would apply only to those stem cell lines derived from unused embryos created for *in vitro* fertilization.

Representatives Michael Castle (R-DE) and Diana DeGette (D-CO) cosponsored the bill, which received strong bipartisan support. Fifty Republican Representatives joined Democrats to vote in favor of the measure. Those who spoke in support of the bill cited the promise of possible treatments and cures, while opponents expressed concerns about the ethics of the research. Debate also touched on the use of stem cell lines derived from adult tissues and cord blood. A second bill to endorse funding of these kinds of stem cell research was introduced by opponents of H.R. 810. It passed 430-1.

The Stem Cell Research Enhancement Act will now be taken up in the Senate where it has the support of key Senators including Arlen Specter (R-PA) and Orrin Hatch (R-UT). Although the bill is expected to pass easily, the administration has threatened to veto any legislation that uses federal funds for research that destroys embryos. While the Senate may be able to muster the two thirds majority needed to override a veto, it is unlikely that the House would be able to do so. Supporters may seek to attach the bill to "must-pass" legislation such as the Labor, Health and Human Services and Education funding bill.

House passage of these measures was due in part to the vocal support of the scientific community. In the weeks and months leading up to this landmark vote, FASEB provided both scientific expertise and the voices of its members. Through emailed CapWiz alerts (see <http://capwiz.com/faseb/home/>) sent to APS and other FASEB

society's members, more than 2000 letters were sent to Representatives throughout the country urging them to vote in favor of H.R. 810. The sustained involvement of the scientific community will be crucial as this measure moves forward.

Confusion Over Tax Status of NRSA Fellowships

Confusion has arisen over the tax status of post-doctoral fellowships following new Internal Revenue Service (IRS) regulations issued earlier this year. Traditionally, post-doctoral fellows receiving Ruth L. Kirschstein Research Service Awards (NRSA) have not been considered employees of either their institutions or the federal government, making them exempt from FICA and Medicare taxes. However, the new IRS regulations were interpreted by many institutions as requiring them to withhold those taxes, just as they do for post-doctoral fellows supported by RO1s.

While the NIH is not allowed to offer tax advice, the agency disagreed with the conclusion that NRSA fellowships were subject to FICA taxes. Instead, it counseled fellows to check with their institutions for guidance. In the wake of a *Science* article (April 29, 2005) on the new regulations, tax attorneys and the IRS later confirmed that NRSA fellows are not required to pay FICA (see *Science's* NextWave from June 2, 2005 for more details). NRSA-like fellowships need to be considered individually, and recipients should consult their institutions for more information on whether they are taxable.

Whether or not NRSA fellows should be considered employees is a topic of some debate. While employee status might allow some post-doctoral fellows to receive more benefits than they otherwise would, there is a trade-off in the income lost to taxes. Since post-doctoral benefits vary greatly between institutions, whether fellows would win or lose by gaining official employee status depends on their funding source and where they work.

Transnational Impacts of Animal Welfare Regulations

The transnational impacts of animal welfare regulations were the subject of a symposium at the International Union of the Physiological Sciences (IUPS) Congress in San Diego. The April 3 session was sponsored by the APS Animal Care and Experimentation (ACE) Committee and co-chaired by **Kevin Kregel** and **Pontus Persson**. The symposium addressed scientific and practical challenges posed both by differences in animal welfare standards among nations and efforts to reconcile these differences, a process known as harmonization.

In his introduction, Kregel, a Professor of Exercise Science at the University of Iowa and Chair of the ACE Committee, explained that new animal welfare standards currently under discussion in Europe could affect researchers throughout the world. Some of the draft proposals are a particular source of concern because they would require significant changes in animal husbandry. Moreover, there is little scientific data showing that these changes would improve the welfare of animals. Of particular concern, according to **J.R. Haywood**, Chair of the Department of Pharmacology and Toxicology at Michigan State University, is the need to recognize that animal welfare standards represent a means to accomplish good science and should not be seen as an end in themselves.

Anne-Dominique Degryse, DVM, Head of Laboratory Animal Resources at the Pierre Fabre Research Center in France described the discussions underway in Europe and provided some specifics about the proposals. At issue is an effort within the Council of Europe (CoE) to revise the animal welfare standards contained in the Appendices to a document known as ETS 123, the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes. Degryse explained that since 1997, a CoE working group has held a series of consultations about revising the animal welfare

standards set forth in Appendix A of ETS 123. Appendix A addresses the housing and care of animals, safety issues, and broader welfare considerations, such as the behavioral needs of animals. The proposals that emerged from the latest round of COE discussions earlier in 2005 would require significantly more cage space per animal, a strong preference for social housing, and would require environmental enrichments that permit the expression of normal animal behaviors.

Current COE standards require that a dog weighing 20-30 kg must be housed in a pen that is 1.7 square meters or 18.3 square feet. The proposed revision would mandate a pen of at least eight square meters (86.1 square feet) for dogs weighing more than 20 kg. The 1996 revision of the ILAR Guide calls for dogs between 15 and 30 kg to be housed in pens with at least 1.08 square meters (11.6 square feet). One rationale for expanded space requirements is that animals are also supposed to be housed socially unless there is a scientific, welfare, or veterinary justification to house them singly. Nevertheless, even singly-housed dogs would have to have opportunities for communal exercise in a separate area. For scientific purposes, dogs less than 20 kg could be kept in smaller enclosures, i.e., with only two square meters (21.5 square feet) for periods of up to 4 hours. When a metabolic cage is used, it must still be large enough to permit the animal to fully stretch, lie down, and turn around. The other proposed requirements for dogs include a comfortable solid resting area such as a raised bed or platform, opportunities for human interaction, and enrichment requirements that include group housing in pens, chewing objects, and opportunities to exercise. In addition, if natural light is totally excluded, a night light of 5-10 lux must be provided in each housing unit to permit some vision. [and to take account of their startle response.]

These proposals would have no immediate impact since COE Treaties are only advisory. The COE was created in 1949 to bring about greater unity among European nations based upon the ideals and principles of their com-

mon heritage. It operates through Treaties and Conventions that its 46 member nations adopt through ratification, but there are no penalties for failing to comply. Nevertheless, these non-binding proposals are viewed as an international consensus that has been reached through extensive multi-lateral consultations with a wide range of organizations including research, industry, and veterinary medical organizations, as well as animal rights groups.

Of much greater potential significance are the positions adopted by the European Union, which now consists of 25 nations. The EU grew out of the Common Market that was founded in 1957 to promote social and economic progress through open and fair trade. The EU also sets animal welfare standards for its members, and failure to observe these standards can result in financial penalties. Moreover, EU "Directives," as they are called, must be incorporated into member states' national laws. Directive EC/86/609, which is currently in force, includes as its Annex II the same housing standards contained in Appendix A of ETS 123. In addition, Directive 2003/65/EC and Council Decision 2003/584/EC include provisions that now make it possible to make direct modification of EU technical Appendices based upon CoE Conventions.

At the same time that the COE is holding consultations on its animal welfare standards, the EU has a Technical Expert Working Group on animal welfare issues. A number of subgroups are addressing questions related to the scope of coverage, ethical review requirements, cost-benefit analyses, and pain severity classifications. Issues under consideration include whether to include invertebrate animals and whether to cover the fetal and embryonic forms of vertebrate species, and if so, starting at what developmental stage. Another topic under consideration is setting species-specific guidelines for approved methods of humane euthanasia.

Pontus Persson discussed the impact of animal welfare regulations on international collaborations and journal publication. Persson is a Professor with the Johannes Mueller

Institute of Physiology at Humboldt University in Berlin as well as the Editor of American Journal of Physiology-Regulatory, Integrative, and Comparative Physiology. He noted that some countries lack effective enforcement mechanisms for their welfare regulations and that the growing complexity of regulatory requirements represents a problem, as do national differences between regulations. These differences sometimes mean that researchers in one country are not permitted to conduct certain procedures needed for a collaboration. In terms of publication, national differences may interfere with the ability to get research published. For example, the APS journals will not publish articles based upon research that does not conform to U.S. animal welfare requirements.

David Brooks of GlaxoSmithKline Pharmaceuticals discussed the impact of international animal welfare standards on the pharmaceutical industry. He noted that dealing with differences in animal welfare standards poses many challenges to companies operating in a multi-site and global environment. Pharmaceutical industry research has a number of special characteristics. While much research may be done internally, some may be conducted by contract research organizations or undertaken in collaboration with academic institutions. Another special characteristic is the fact that industry must conduct a wide range of animal studies in order to satisfy the disparate demands of drug discovery, drug development, safety assessment, and regulatory work. Moreover, this work must conform to specific regulatory requirements.

Brooks noted that the "pharmaceutical industry" does not have a unified position on global harmonization of animal welfare standards. In fact, there is even confusion about what the term "harmonization" describes since it could be applied to laws, regulations, standards, minimum standards or best practices. The one point of agreement concerns a recommendation that emerged from a November 2003 ILAR workshop on "The Development of Science-based Guidelines for Laboratory Animal

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Care.” That recommendation was that new animal welfare standards should be based upon sound science, that they should be demonstrably beneficial to animals, and that they should not create unnecessary burdens for the conduct of research.

Brooks noted that industry has its own concerns about harmonizing internal animal care and use practices to facilitate its research programs between sites, including those of contractors and collaborators. Harmonization of animal care and use is needed to assure that data obtained are scientifically valid and meet regulatory criteria. Industry also frequently faces obstacles when companies are merged because of differences in practices and equipment. Thus, national differences in regulations are only one of the obstacles to harmonization of animal care and use practices within industry.

Essentially there are two possible ways to approach harmonization, according to Brooks. One option is to use engineering standards based upon the most stringent applicable national regulations. However, this approach is problematic because matching the most stringent set of standards in all facilities is costly and may be difficult to implement since in some cases, there are inconsistencies between regulatory requirements. It is difficult to reconcile these using a prescriptive engineering approach. A second option is to adopt performance-based standards that focus on achieving optimum animal welfare outcomes while allowing some flexibility in terms of how those outcomes are achieved. The Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC), International, accepts the flexible approach of performance-based standards while evaluating animal care and use programs based upon their adherence to the *ILAR Guide for the Care and Use of Animals* along with any other applicable regulatory standards.

MSU’s Haywood noted that international collaborations using animal models can be expected to increase

and that the scientific community needs to participate in the harmonization process to assure that the quality of science is sustained. Team science is on the rise as science becomes more interdisciplinary and communications become easier and as more governments recognize that research generates economic growth. Because animal-based research plays an essential role in biomedical research, specialized resources such as equipment and transgenic animals need to be shared. This represents a challenge because if there are differences in animal care and use requirements, it is difficult to perform well-controlled collaborative experiments.

If the scientific community wants to ensure quality animal care across nations, this raises the question, what is quality animal care? Haywood suggested that the starting point for quality animal care involves ethical principles, guidelines, and/or laws protecting animals in research. It also means standards for housing and husbandry as well as for animal use. In addition, ethical review of protocols is needed, such as what is provided in the U.S. through an animal care and use committee. Finally, there must also be some kind of enforcement mechanism, whether through self-monitoring as performed by IACUCs or through external authority. Most nations have some type of formal animal care oversight, but there are differences both in the kinds of oversight and the nature of the requirements.

Haywood recommended a set of guiding principles that should be applied to ensure maximization both of animal welfare and high quality science. These include the need for a scientific foundation for whatever guidelines are put in place, that the guidelines or standards should be formulated as performance based standards that rely upon outcomes, and that there should be a role for the exercise of professional judgment by laboratory animal veterinarians. This approach is preferable to prescriptive engineering standards, which may not serve the best interests of animal welfare or science.

Haywood also described the international harmonization efforts of the International Council for Laboratory Animal Science (ICLAS), which grew out of a committee established in 1956 by UNESCO, the International Union of Biological Sciences, and the Council for International Organizations of Medical Sciences. These organizations, which seek to promote international cooperation among national biomedical sciences groups, chartered ICLAS to “promote the humane use of animals in research through recognition of ethical principles and scientific responsibilities.” ICLAS is now seeking to harmonize various national guidelines by applying principles and precepts that have been adopted by international consensus. Haywood said that ICLAS is trying to create working groups consisting of representatives of the ICLAS member organizations along with stakeholders from the larger scientific community, to achieve consensus on topics such as euthanasia and humane endpoints for experimentation.

Another approach to harmonization would be to rely upon a non-governmental accreditation process, such as the one offered by AAALAC, International. This approach would supplement national governmental oversight with accreditation that relies upon accepted international standards along with that country’s laws, guidelines, and policies.

Haywood urged scientists to get involved in these issues so that efforts to harmonize animal care standards will focus on animal welfare as a means to accomplish science, rather than an end in itself. One way for scientists to get involved is by speaking out to assure the public of their concern for animal welfare. This is particularly important because so much misinformation about the use of animals in research has been spread by animal rights activists. At the same time, scientists also need to find ways to provide input into the development of guidelines, policies, and regulations, such as the ones now under development by the COE. ❖

Postdoctoral Position

Postdoctoral Position: Postdoctoral opportunity in the Department of Biomedical Engineering at IUPUI in the area of experimental and computational study of cardiovascular afferents. In situ cardiovascular reflex studies, cellular electrophysiology, computational modeling and methods of dynamical systems analysis are synergistically applied in the laboratory. The overarching objective of these studies is to advance our understanding of how the disparate patterns of activity arising from myelinated and unmyelinated cardiovascular afferents uniquely participate in the neural control of heart rate. Presently, we are conducting electrophysiological and hemodynamic studies of the neuro-mechanical basis of baroreceptor function, patch clamp studies of the ionic channel function in myelinated and unmyelinated baroreceptor afferent neurons and advancing the biological realism of ion channel based computational models of these nodose sensory afferent neurons and small systems of synaptically coupled neural circuits at the level of the NTS. Experience with relevant computational methodologies, neuroanatomical, neurophysiological, or in situ methodologies in studying cardiovascular reflex dynamics would be favorably received. Start date is August 2005. Contact information: John Schild, PhD, jschild@iupui.edu; <http://www.engr.iupui.edu/~jhs/>.

Postdoctoral Positions: Multiple postdoctoral positions are available in the laboratory of Dr. Tianxin Yang in the Division of Nephrology at University of Utah to conduct projects funded by four NIH grants. The central goal of the research program is to understand the role of arachidonic acid metabolites in renal physiology and pathophysiology. Currently, there are four major projects in the lab: 1) to study interaction of COX-2 and nNOS in regulation of renin secretion; 2) to study the role of renal medullary COX-2 in regulation of sodium balance and blood pressure; 3) to study the role of prostaglandins in tubulointerstitial

fibrosis; and 4) to study renal function of peroxisome proliferator-activated receptors. Experimental approaches involve gene knockout, cellular biology, whole organ physiology, etc. Highly motivated individuals with strong background in molecular biology and renal physiology are seriously considered. Please email CV and names of three references to: Dr. Tianxin Yang, MD, PhD, Associate Professor, Division of Nephrology, University of Utah, 30 North 1900 East, Rm 4R312, Salt Lake City, UT 84148; Email: Tianxin.Yang@hsc.utah.edu.

Postdoctoral or Research Fellow Position

A postdoctoral or research fellow position if available in the Cerebral Microcirculation Laboratory, Department of Neurological Surgery at Washington University. The applicant will participate in our ongoing NIH funded research project on effects of hypoxia/reoxygenation on cerebrovascular regulation. These studies will involve observation of physiological responses in isolated cerebral micro-vessels and cerebrovascular cells in culture. Further techniques used in this project consist of video- and fluorescence microscopy, ion sensitive dyes and electrodes, immunohistochemistry, proteomics and protein transduction. Good technical and writing skills are essential. Applicants who can introduce new technologies relevant to the project will be preferred. To be given full consideration applicants must send their resumes (CV) and arrange for three letters of reference to be sent to: Dr. Ralph G. Dacey, Jr., Professor and Chairman, or Dr. Hans H. Dietrich, Research Assistant Professor, Department of Neurological Surgery, Washington University, 660 S. Euclid Ave., St. Louis, MO 63110; Fax: 314-362-2107. Review of applications will begin on June 1, 2005 and will continue until the position is filled. [AA/EOE]

Research Positions

Research Scientist: Education: This position requires a Bachelor's Degree plus 10 years of experience; or

Master's Degree plus eight years of experience; or PhD plus six years of experience in a science, engineering, allied health field or equivalent experience. An advanced degree in Exercise Science from an accredited institution is preferred. A minimum of five years of experience in a life sciences position, conducting or coordinating research on human subjects, is required. NASA or aerospace related experience is highly desired. Demonstrated experience in successful proposal writing and/or technical writing (e.g. publications) is required. Detailed knowledge of current space flight exercise hardware and physiologic trends, including published and unpublished findings, is required. Standard Microsoft Office software proficiency for preparing reports and presentations; ability to complete basic statistical techniques; excellent written and verbal communication skills; demonstrated ability to work independently and as part of a team; ability to travel independently (domestic and international); ability to generate project schedules using Microsoft Project is desired; experience with basic exercise physiology procedures (e.g., VO₂ max, isokinetic testing, etc.) is desired; and certification by the American College of Sports Medicine is preferred. This position requires US Citizenship or Permanent Resident Status. Description: the purpose of this position is to support the Exercise Countermeasures Project (ECP) at the NASA Johnson Space Center. This position assists the ECP Project Manager and Project Scientist in evaluating and validating candidate exercise countermeasure hardware and prescriptions, alone and in combination with other countermeasures, for the protection of crew health and safety during lunar and Mars space travel. This position has technical responsibility for interpreting, organizing, executing, and coordinating ECP science assignments. Additionally, this position serves as the science technical expert for completion of literature searches, generation of draft operational test protocols, and compilation of test findings pertinent to the project. The incumbent communicates project objectives, needs, and requirements to project

team leaders; coordinates meetings; generates and maintains project science documentation, and assists in the long-term planning for meeting programmatic goals. The incumbent will be responsible for representing the ECP Project Scientist in a multidisciplinary team and obtaining approvals from JSC and other review boards. This individual must possess a thorough understanding of research design, ability to critically analyze research data and assimilate findings. This position requires an in-depth knowledge of human exercise physiology, exercise responses during and after real and simulated space flight, and exercise countermeasure hardware and prescriptions utilized during the US and Russian space programs. Interested candidates should send a current resume with job number (WBHAC-0535) and salary requirements to: Wyle Laboratories Life Sciences Systems and Services, Human Resources Department, 1290 Hercules, Houston, TX 77058; Fax: 281-212-1211; Email: recruiting@wylehou.com. [EOE M/F/H/V] Smoke-free workplace.

Research Scientist/Postdoctoral Fellow: Available Immediately: Applications are invited for a research scientist to work in the laboratory of Dr. Lisa Merlin examining the functional properties of hippocampal metabotropic glutamate receptors and their influence on neuronal network excitability and epileptogenesis. Suitable candidates will have an advanced degree (MD or PhD); experience using intracellular and extracellular electrophysiological recording techniques a plus. The Merlin laboratory is a friendly and enthusiastic environment with funding from the National Institutes of Health. Examples of our recent work can be found in the *Journal of Neurophysiology*. Salary commensurate with experience. Applications, including CV, a cover letter, and at least two letters of recommendation, should be sent to Dr. Lisa R. Merlin, Professor of Neurology and Physiology and Pharmacology, SUNY Downstate Medical Center, 450 Clarkson Avenue, Box 29, Brooklyn, NY 11203, or may

be sent as attachments to: lisa.merlin@downstate.edu. Letters of reference must be sent independently and have a contact phone number or email. [AA/EOE]

Research Associate/Postdoctoral Fellow Position: A Research Associate/Postdoctoral Fellow position is available on July 1 in a neurocardiology laboratory in the Department of Physiology. The focus of the research is to understand the neural regulation of cardiovascular function during activation of cardiac ischemia-sensitive afferent neurons. Mediation of the input signal by measuring the release of specific neuropeptides at various levels of the CNS will be studied in an in vivo animal model. Antibody-coated microprobes will be used to study release of peptides. Applicants with a PhD and/or MD and documented experience in animal surgery, cardiovascular functional measurements, neurophysiological techniques and basic imaging techniques are welcomed to apply. Prior experience with immunostaining and in situ hybridization is also required. Other molecular biology experience is preferred to complement ongoing projects. The applicant must demonstrate excellent oral and written communication skills. This is a two-year position, funded through the AHA (otherwise contingent upon outside funding). Please send a curriculum vitae along with a letter of interest and contact information for three professional references to: Dr. Carole Williams, Professor, Dept. Physiology, East Tennessee State University, College of Medicine, PO Box 70576, Johnson City, TN 37614; Phone: 423-439-2044; Email: williams@etsu.edu. [AA/EOE]

Teaching Position

Animal Physiology and/or Neurophysiology Position (non-tenure-track). The University of Texas at Austin, School of Biological Sciences (<http://www.biosci.utexas.edu>) invites applications for full or part-time positions as Lecturer from individuals with teaching expertise and experi-

ence in animal physiology and/or neurophysiology. Appointments to begin in the Fall 2005 semester. A PhD or equivalent is required at the time of appointment. The full-time teaching load is three courses per semester. The review of applications has begun and will continue until positions are filled. **Applicant Instructions:** Please send a letter of interest that includes a history of teaching experience, a CV, and the names and addresses of three references. Applicants may later be asked to submit a teaching portfolio. Send materials to: Cathy Prescott, School of Biological Sciences, The University of Texas at Austin, 1 University Station A6500, Austin, TX 78712. A background check will be conducted on applicants selected. [AA/EOE]

Assistant/Associate Professor: The Center for the Study of Health Effects of Exercise in Children in the Department of Pediatrics at the University of California, Irvine (UCI) is seeking to recruit a research investigator in the in-residence series. The level will be at the Assistant or Associate level, commensurate with experience. The successful candidate must have an MD or MD/PhD and be capable of conducting independent research broadly focused on the mechanisms of health effects of exercise in the context of the growing child. Experience in clinical pediatrics as well as dealing with infants or children in research projects focused on obesity, exercise, exercise training and fitness and their relationship to growth and development and the presence of pediatric diseases like asthma, diabetes or arthritis is necessary. A proven track record of original publications in this field is a prerequisite. Teaching responsibilities will include formal participation in exercise physiology and practice courses and lecture series aimed at UCI undergraduates, medical students and postdoctoral fellows. In addition, the candidate will be expected to be familiar with bedside and outpatient teaching of pediatric residents in the area of clinical exercise. Clinical duties will include evaluation and treatment of children and adolescents with sports or exercise related injuries and conditions and

developing protocols for pre-participation sports physicals. This position is located at UCI Medical Center, the only full-service academic hospital in an extended geographic region and serves a large patient base. It is located in thriving Southern California, which offers diverse cultural and recreational opportunities. Interested candidates should send their curriculum vitae and three references to: Dan M. Cooper, MD, Professor and Search Chairman, Department of Pediatrics, 101 The City Drive, Bldg. 25, 2nd Floor, Orange, CA 92868; Email: dcooper@uci.edu. [AA/EOE]

Assistant Professor: The War Related Illness and Injury Study Center (WRIISC; <http://www.wri.va.gov>), located at the New Jersey Health Care System (NJHCS), East Orange Campus is accepting applications for the position of a research physiologist at the advanced Assistant Professor level. The WRIISC has a successful history of interactive, collaborative, funded research pertaining to military deployment related health issues. The new member of the WRIISC research team will enhance the existing research activity and develop their own externally funded research program. Applicants from all areas of physiology are welcome, but experience with cardiovascular, metabolic, environmental physiological measurements is desired. We are particularly interested in candidates whose work relates to pain and other chronic health conditions. Qualified candidates should forward their resume via Email: lange@njneuromed.org; Fax: 973-395-7114, attn: Dr. Lange.

Director Position

Senior Director/Director of Toxicology: We have an exciting opportunity for a Director of Toxicology. This person will work closely with our multi-disciplinary team of scientists who are dedicated to the development of novel anti-viral pharmaceuticals with have the potential to revolutionize the treatment of several Infectious diseases. **Responsibilities:** Develop pre-clinical strate-

gy for Idenix's pipeline of products; work with a group of outside experts to build consensus regarding non-clinical development strategy; develop plans for conducting toxicology studies; generate protocols, identify contract labs for conducting the studies and monitor the studies; management of the overall preclinical safety and ADME assessment of compounds in all stages of preclinical research and development; respond quickly to information learned from ongoing studies and provide input to management and clinical development to guide program prioritization; work with the manufacturing team to ensure supply of appropriate pre-clinical test materials; review and edit study reports and summarize results for presentation to FDA, investors and others outside of the company; generate/review regulatory documents for pre-IND packages, IND and NDA submissions and Investigators' brochures; interface with FDA on preclinical matters; utilize additional expert toxicology consultants as appropriate to manage workload; interface with corporate partners. **Skills Required:** experience in toxicology related to all stages of drug development from feasibility to NDA submission; primary responsibility for numerous INDs and for at least one successful NDA filing; experience in working with contract labs and outstanding relationships with lab study directors; experience in FDA interactions and excellent relationships with FDA officials; experience working with antiviral/anti-infective oral drugs. **Education and**

Experience: DVM and/or PhD in pharmacology/toxicology or pathology; board certification (e.g., A.C.V.P., D.A.B.T.); 10+ years experience in pre-clinical pharmaceutical drug development, with a primary focus, for 8+ years, in toxicology; should be familiar with GLP regulations and with all of the US and ICH regulatory processes in drug development and have significant experience managing outsourced GLP studies in contract research facilities. No phone calls or agencies please. Idenix offers an excellent benefits package including competitive salary, equity compensation, major medical insurance, dental insurance, 401(k) plan participation, and group life and disability insurance. To be considered for this position, please send your resume by email to hr@idenix.com, or by mail to: Human Resources Idenix Pharmaceuticals, 60 Hampshire Street, Cambridge, MA 02139. ❖

Research Physiology Assistant Professor

War-Related Illness and Injury Study Center
New Jersey Health Care System

The War Related Illness and Injury Study Center (WRIISC; www.wri.va.gov), located at the New Jersey Health Care System (NJHCS), East Orange Campus is accepting applications for the position of a research physiologist at the advanced Assistant Professor level. The WRIISC has a successful history of interactive, collaborative, funded research pertaining to military deployment related health issues. The new member of the WRIISC research team will enhance the existing research activity and develop their own externally funded research program.

Applicants from all areas of physiology are welcome, but experience with cardiovascular, metabolic, environmental physiological measurements is desired. We are particularly interested in candidates whose work relates to pain and other chronic health conditions.

Qualified candidates should forward their resume via e-mail: lange@njneuromed.org or fax (973)395-7114 attn: Dr. Lange.

Wise Appointed Provost of the University of Washington

Phyllis Wise, currently dean of the Division of Biological Sciences at the University of California, Davis, has been appointed Provost of the University of Washington, pending approval of the UW Regents. Wise, who is a distinguished professor of neurobiology, physiology and behavior in the Division of Biological Sciences, and professor of physiology and membrane biology in the School of Medicine at Davis, has served in her current position since 2002. Prior to that, she was professor and chair of the Department of Physiology at the University of Kentucky from 1993 to 2002. Dr. Wise was a faculty member at the University of Maryland, Baltimore, from 1976 to 1993.

Campbell Named Head of Department at University of Iowa

Kevin Campbell has been named head of the Department of Physiology and Biophysics at the University of Iowa Roy J. and Lucille A. Carver College of Medicine. The appointment is effective July 1. Campbell, a Howard Hughes Medical Institute Investigator, has served as interim head of the department since 2002. He also holds joint appointments in the UI Departments of Neurology and Internal Medicine.

S. Jamal Mustafa Named Part-time Assistant Dean for Research

The Robert C. Byrd Health Sciences Center at West Virginia University has announced the recruitment of **S. Jamal Mustafa** to the institution. In addition to bringing his research laboratory from East Carolina, Mustafa will also serve as part-time assistant deans for research in the School of Medicine. Mustafa is presently a pro-

fessor at East Carolina University School of Medicine active in cardiovascular pharmacology and physiology research. He will join the faculties of the WVU Schools of Medicine and Pharmacy.

Lisa C. Hazard, an Assistant Professor, joined the Department of Biology and Molecular Biology, Montclair State University, Upper Montclair, NJ. Hazard was formerly a Postdoctoral Fellow with the Department of Ecology and Evolutionary Biology, University of California, Santa Cruz, CA.

Vallie Michelle Holloway has affiliated with the Mayo Clinic of Jacksonville, Jacksonville Beach, FL., as a Postdoc Fellow. Holloway was previously associated with the Burn, Shock and Trauma Institute, Loyola University Medical Center, Stritch School of Medicine, Maywood, IL.

Benjamin C. Kautza recently affiliated as a student with the Medical College of Wisconsin, Milwaukee, WI. Kautza moved from the Department of Health Exercise & Rehab Sciences, Winona State University, Winona, MN.

Sachiyo Nomura, an Associate Professor, has joined the University of Tokyo, Department of GI Surgery, University of Tokyo Hospital, Tokyo, Japan. Nomura was formerly a Research Fellow with the Department of Surgery, Vanderbilt University School of Medicine, Nashville, TN.

Timothy R.H. Regnault, an Assistant Professor, has affiliated with the University of Western Ontario, Department Ob/Gyn, St. Joseph's Health Care, London, Ontario, Canada. Prior to his new position, Regnault was associated with the University of Colorado Health Science Center/Perinatal Research Center, Department of Pediatrics, Section Neonatology, Aurora, CO.

Jason M. Roper is currently a Staff Toxicologist, Wil Research Laboratories, LLC, Ashland, OH. Prior to his

new position, Roper was associated with the Department of Environmental Medicine, University of Rochester School of Medicine, Rochester, NY.

Ross D. Shonat has accepted the position of Scientific Review Administrator, with the National Institutes of Health, Center for Scientific Review, Bethesda, MD. Shonat was formerly an Assistant Professor, Department of Biomedical Engineering, Worcester Polytechnic Institute, Worcester, MA.

Mary E. Sunday recently accepted a position as Professor with the Department of Pathology, Duke University Medical Center, Durham, NC. Sunday was formerly Associate Professor, Children's Hospital, Boston, MA.

Kevin Tipton is currently Senior Lecturer, School of Sport and Exercise Sciences, University of Birmingham, Edgbaston, Birmingham, UK. Formerly, Tipton was affiliated with the Department of Surgery, Shriners' Burns Institute, Texas Medical Branch, Galveston, TX.

Gervais Tougas accepted the position, Disease Area Section Head, Department of Gastroenterology Clinical Research & Development, Novartis Pharma AG, Basel, Switzerland. Tougas was formerly Associate Professor, Department of Medicine, Division of Gastroenterology, McMaster University, St. Joseph's Hospital, Hamilton, Ontario, Canada.

Joel V. Weinstock has joined the Department of Internal Medicine, Tufts New England Medical Center, Boston, MA. Weinstock moved from the Department of Gastroenterology and Hepatology, University of Iowa Hospitals and Clinics, Iowa City, IA. ❖

Letter to Julio Cruz

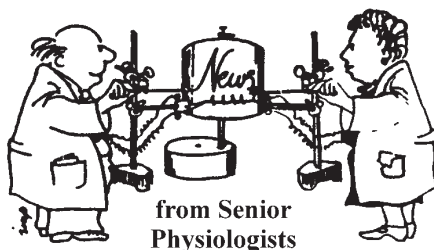
Jim Heath writes: "Thank you for your letter. I moved to Texas when I retired from the University of Illinois. My wife, who is an entomologist, and I have collaborated for a number of years on the physiology and ecology of cicadas. We found a house with a garage that was constructed twice as deep as usual and had casement windows across the back and all services. We converted half of the space into a 17x22 foot laboratory. We have enough equipment to do both field and modest laboratory study. We have worked extensively on relating temperature regulation and energetics to the habitat of species from the Southwest US, Argentina, Australia and New Zealand.

"In the field we try to identify the host plant of each species, since most have narrow food preferences. We also try to determine life history characteristics like longevity of the adult phase and total lifetime, song structure, mating behavior etc. We have begun studies of soil characteristics of the native habitat, since the early instars live on roots deep in the soil. We are publishing regularly. Because housing and working with insects does not come under restrictive rules, we can do this at home.

"In addition, I am trying to complete the writing of a number of studies dealing with mammalian temperature regulation. I continue to edit the *Journal of Thermal Biology* with Kenneth Bowler of Durham.

"I have served on the local Friends of the Library. I teach safe boating classes, and have served on the Citizens Advisory Committee for Lake Buchanan to the Lower Colorado River Authority. I have been president of the Highland Lakes Wildflower and Birding Society and directed the Audubon Bird count for Burnet County for two years. With a friend, I have performed in a jazz duo with my guitar and his flute, a good combination for Brazilian bossa nova and samba.

"Both my wife and I are active in Heritage societies related to genealogy. She is a past Regent of the local DAR chapter and I am presently State President of the Sons of the American



Revolution. I have given lectures around the state on the status of Science or Medicine at the time of the American Revolution and on the Science of Ben Franklin.

"We just celebrated 50 years of marriage with 180 close friends and relatives. We were married quite young and managed to raise three children while pursuing our science. We both hold PhDs, although many thought we would never finish college.

"We live on Lake Buchanan, a 30x5 mile reservoir; we get too little time for sailing."

Letters to Edgar Folk

Hal Levey writes: "Please excuse the long delay in responding to the APS recognition of my 80th birthday. I seem to recall that on that day, August 14 (that I share with VJ Day), I was on a remote beach in Minorca, along with assorted naked Europeans, eating sea urchins just plucked from the rocks along the shore. That evening, I dined on the local specialty, roast kid—repressing my sympathy for the cute little creature that might have been gamboling gaily in a field of wild flowers a few days earlier. I also spent some time in Barcelona, where I sampled absinthe for the first time in the London Bar just off the Rambla; and tasted the most expensive smoked ham in Spain, called Jabugo, at about \$100 per pound. For some reason, recollections of my years teaching endocrinology to medical students never entered my mind.

"Advice to young physiologists? Stay focused, publish, get grants, travel to international meetings, and try to locate my secret beach in the Mediterranean."

Francis M. Knapp writes: "In 1952, following my return from Korea where

I had been an aide-de-camp to a two-star general commanding an infantry division, I applied for admission and was accepted at the University of Southern California for graduate work in the Department of Physiology in the medical school. I was a bit older than my classmates because I had also commanded a heavy weapons company in an infantry battalion in WWII, and yet to complete two undergraduate years between wars.

"I was very fortunate to be invited to work in the laboratory of Chester Hyman, who was investigating microcirculation in various systems which included the brain. At that time, regional bloodflow in the brain was not well-defined. [I virtually memorized Car Schmidt's monograph on 'The Cerebral Circulation in Health and Disease,' plus papers he and Seymour Kety were producing.] Being in Chester's laboratory introduced me to many who visited, such as Ben Zweifach, Eugene Renkin, Ralph Sonnenschein and others who were leaders in Physiology, who enhanced my development.

"My postdoctoral study was at Karolinka Institutet in Borje Uvnas's Department of Pharmacology in Stockholm. What a magnificent man he was. [He was a member of the Nobel Prize selection committee, and arranged my attending dinner for the prize winners.] It was in his facility that I met one of Physiology's current super stars—Olga Hudlicka. Our primary projects were separate, but we were asked to work together on verification of the brain location of the sympathetic vasodilator center.

"Upon returning to the United States, I spent five years with Harold and Williamina Himwich in Illinois. The Thudicum Laboratory, of which Harold was the director, was a diversified group of researchers and projects related to the brain. My group, among a number of other things, was approaching the implanting of an electromagnetic flow meter on the Circle of Willis to determine blood flow under varying conditions. Working with us, hydrology engineers at the University of Illinois had developed a model of the Circle of Willis. With flow meters and computers we gathered data that

(continued on page 218)

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simulated what might occur in a living situation.

"Then came the university years—of grant proposals; teaching at both undergraduate and graduate levels; directing graduate student research; chairing the Health Professions committee and sending student evaluations to medical, dental, etc., schools; dozens of meetings on various matters; president of the Faculty Senate; Department Chair; Dean at a major University; trips to scientific meetings; member of community groups; boards of major and minor significance. I had become an administrator

with arthritic hands that resulted in leaving the laboratory except in an advisory capacity.

"I retired 12 years ago during which span my knowledge of physiology has been slipping away, in large part because of the micro-direction in which it has moved. I was trained as a generalist with emphasis on cardiovascular and neural physiology, but remained very conscious of the research being done in the other bodily systems. The interrelationships are essential. A living organism doesn't function as a collection of separate entities.

"I occasionally attend the weekly

lectures in Bioengineering at the University of California, San Diego, and for several years in a drug testing program in the Department of Rheumatology at the medical school. I am also a member of the Plan Committee in the Clairemont district of San Diego, and also the Redevelopment Committee for a large segment of the city.

"I thank you for suggesting me to write as I being to approach another year in the 80s. I'm not one of the 'whiz kids' of the American Physiological Society, but I am a proud physiologist. I hope that I've left a few things of value along the way." ❖

Books Received

Beverages in Nutrition and Health.

Ted Wilson, PhD, and Norman J.

Temple, PhD, (Editors).

Totowa, NJ: Humana Press, 2004, 427 pp., illus., index, \$125.00.

ISBN: 1-558-29-173-1.

Human Body Composition, Second Edition.

Steven B. Heymsfield, Timothy G.

Lohman, ZiMian Wang, and Scott B.

Going, (Editors).

Champaign, IL: Human Kinetics, 2005, 523 pp., illus., index, \$89.00.

ISBN: 0-7360-4655-0.

Announcement

Robert Bosch Foundation Fellowship

Program Application Deadline: **October 14, 2005**

Program Dates:

September through May (9 months)

Number of Participants: 20

As the countries of the world become more interdependent, the Robert Bosch Foundation recognizes the importance of familiarizing American professionals with the political, economic, and cultural environment of Europe and of the Federal Republic of Germany. To further this goal, and to strengthen the ties of friendship and understanding between the United States and Germany, the foundation sponsors a fellowship program that enables young American professionals to participate in an intensive work and study program in Germany. Although a prime goal of this program is the advancement of American-German/European relations, it also contributes to the participants' professional competence and expertise, and broadens

their cultural horizons.

The program provides young American professionals (23-34) with executive level internships in the federal government and private sectors in Germany. Seminars in Berlin, Frankfurt and Munich as well as visits to Poland, the Czech Republic, Belgium and France provide an in-depth understanding of issues facing the European Union and Germany today. Candidates are competitively chosen from the fields of business administration, economics, journalism and mass communications, law, political science and public affairs/public policy.

Since 1984, over 300 Americans have been given this unique opportunity. Most Bosch alumni become leaders in their professional fields, and commit themselves to the long-term stabilization and growth of German-American relations.

Applications must be received no later than **October 14, 2005** for the

program beginning in September 2006.

Program Requirements

Citizenship : US Citizen

Age: 23-34 at time of application.

Language: German fluency required at start of program. If needed, language training will be provided by the Bosch foundation in the US and Germany.

Education: Graduate degree or at graduate level training in business administration, economics, journalism, mass communications, law, political science, public affairs/public policy.

Work Experience: At least two years relevant work experience.

The Robert Bosch Foundation, located in Stuttgart, Germany, is one of the largest corporate foundations in Germany and was formed to further the philanthropic and social endeavors of its founder, Robert Bosch (1861-1942). Established in 1964, it holds 92% of the shares of the Robert Bosch Company. ❖

European Respiratory Society Offers Three New Courses: Tuberculosis, Sleep Medicine, Medical Aerosols

Tuberculosis

Bucharest, Romania
October 25-27, 2005

Educational aims

Tuberculosis (TB) is a public health priority in Central and Eastern Europe due to recent socio-economic constraints (affecting both population and health services) coupled with the dramatic rise of HIV infection. TB control requires a comprehensive approach involving clinicians, laboratory staff, non-medical personnel and public health specialists.

Topics

Epidemiology of TB and MOTT
Resistance patterns
Common and unusual pathological findings
Diagnostic methods and procedures
Radiological findings (chest Xray, CT scan)
Therapeutics approaches

Target audience

Practicing pulmonologists; practicing pathologists; practicing radiologists; residents and fellows.

At the end of the course, participants will:

- have a greater knowledge of the epidemiology of TB and related diseases;
- be able to correlate clinical presentations with pathological and radiographical features;
- be able to improve their daily practice in the treatment of TB.

Registration deadline:

October 1, 2005.

For more information, go to <http://www.ersnet.org/ers/>.

Sleep Medicine

Antwerp, Belgium
November 10-12, 2005

Educational aims

The attendants will gain insight into the physiology and pathophysiology of sleep related breathing disorders. They will acquire practical skills such as performance of polysomnography and applications of various treatment modalities.

Format

Theoretical /lectures
Practical: Tracings-Software CD ROM

Tutorials: free discussion, meet the experts

At the end of the course, participants will be able to:

- perform polysomnography and establish the most appropriate protocols for this purpose;
- apply CPAP for OSA;
- make other therapeutic choices for CSA and OSA.

Registration deadline:

October 31, 2005.

For more information, go to <http://www.ersnet.org/ers/>.

Medical Aerosols

Budapest, Hungary
November 25-26, 2005

Educational aims

The course will:
increase the number of healthcare workers with an adequate knowledge of aerosol medicine;
provide a jump start in state-of-the art basics of aerosol medicine;
be evidence-based;
focus on basic aerosol science needed to deliver optimal clinical care;

focus on implementation of the ERS nebulizer guidelines;

include both paediatric and adult aspects of aerosol medicine

Target audience

(Paediatric) pulmonologists; pediatricians with a focus on lung diseases; allied respiratory professionals responsible for training and evaluating aerosol therapy in

patients; CF care givers; clinical fellows in training to become (pediatric) pulmonologists; other healthcare workers with a focus on aerosol medicine.

At the end of the course, participants will understand:

- basic aerosol science;
- key issues of treating diseased airways;
- patient related factors influencing efficacy of aerosol therapy;
- key factors to instruct and monitor technical skills of patients;
- key factors related to regulatory issues;
- specific pharmacokinetic/dynamic issues related to aerosol medicine.

Registration deadline:

November 15, 2005.

For more information, go to <http://www.ersnet.org/ers/>. ❖

Research Scientist Opportunities

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September 6-18

Short Course on Integrative Systems Pharmacology, Bar Harbor, ME. Information: <http://www.jax.org/courses/events/coursedetails.do?id=127>.

September 7-11

Prion Biology, Cambridge, United Kingdom. Information: <http://meetings.cshl.edu/meetings/prionuk05.shtml>.

September 10-13

2005 International Conference on Aquaporins, Brussels, Belgium. Information: <http://users.skynet.be/fa013024/aquaporins/index.htm>.

September 10-13

Microcirculation 2005—A Transatlantic Microcirculation Conference, University of New Hampshire, Durham, NH. Information: <http://microcirc.org/USUKMeeting05/MCSBRIT05.html>.

September 11-14

Ninth International Conference on Endothelin (ET-9), Park City, UT, USA. Information: <http://www.int.med.utah.edu/et9/>.

September 17-21

15th Annual Congress of the European Respiratory Society (ERS), Copenhagen, Denmark. Information: <http://www.ersnet.org>.

September 23-October 1

Short Course on Genetic Approaches to Complex Heart, Lung and Blood Diseases, Bar Harbor, ME. Information: <http://www.jax.org/courses/events/coursedetails.do?id=128>.

September 24-25

Molecular Anatomy and Physiology of Ribbon Synapses, Goettingen, Germany. Information: <http://sfb406.uni-goettingen.de>.

September 25-28

Asian Pacific Digestive Week 2005, Seoul, Korea. Information: <http://www.APDW2005.org>.

September 28 - October 2

Functional Genomics of Mammalian Nervous Systems, Wellcome Trust Conference Centre, Hinxton, Cambridgeshire, UK. Information: <http://meetings.cshl.edu/meetings/neugenuk05.shtml>.

September 29 - October 1

Symposium in Honor of Dr. Leon E. Farhi, Buffalo, NY. Information: Dr. Harold Strauss (716-829-2738; hstrauss@buffalo.edu) or David Pendergast (716-829-3830; dpenderg@buffalo.edu).

October 1-4

The Mouse As An Instrument For Ear Research II, Bar Harbor, ME. Information: Erin McDevitt, Course and Conference Coordinator, The Jackson Laboratory, Courses and Conferences, 600 Main Street, Bar Harbor, ME 04609-1500. Tel.: (207) 288-6659; Fax: (207) 288-6080; Email: eem@jax.org; <http://www.jax.org/courses/>.

October 8-13

ESF-EMBO Symposia on Three-Dimensional Sensory and Motor Space: Probabilistic Mechanisms of Learning and Development in Sensorimotor Systems, London, UK. Information: Corinne Le Moal, Publicity Officer - ESF Research Conferences Unit, European Science Foundation - ESF Research Conferences Unit, 1 quai Lezay-Marnésia, BP 90015, 67080 Strasbourg, France. Tel: +33 (0)388 76 71 35; Fax: +33 (0)388 36 69 87; Email: clemoal@esf.org; <http://www.esf.org/conferences/lc05110>.

October 20-23

Discovery on Target 2005, Target Discovery and Target Validation Strategies, Boston, MA. Information: <http://www.discoveryontarget.com>.

October 20-23

Workshop on Investigation of Human Muscle Function In Vivo, Nashville, TN. Information: Email: HMF2005@vuiis.vanderbilt.edu; <http://vuiis.vanderbilt.edu/HMF2005/>.

October 31-November 4

International Congress of Nanotechnology, San Francisco, CA. Information: The Event Coordinator, International Association of Nanotechnology, Sacramento, CA 95825. Email: info@ianano.org; Internet: <http://www.ianano.org> or <http://www.nanotechcongress.com>.

November 9-12

Ideas to Action: Healthy Living in Canada, Gatineau, Quebec, Canada. Information: <http://www.csep.ca/csep2005.asp>.

November 13-17

SETAC North America 26th Annual Meeting, Baltimore Convention Center, Baltimore, MD. Information: Society of Environmental Toxicology and Chemistry (SETAC), 1010 North 12th Avenue, Pensacola, FL 32501-3367 USA. Tel: 850 469 1500 ext. 28; Fax: 850 469 9778, Email: ashleyt@setac.org; <http://www.setac.org>.

December 7-9

ILSI's First International Conference on Nutrigenomics - Opportunities in Asia, Singapore. Information: Veronita Rusli, Assistant Manager-Science Programs, ILSI Southeast Asia Region, 1 Newton Road, Goldhill Plaza, #03-45 Podium Block, Singapore 308899. Tel: 65-6352-5220; Fax: 65-6352-5536, E-mail: ilsi.nutrigenomicsconf@ilsisea.org.sg.

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