

TWEET ABOUT THE ANNUAL MEETING: USE #ASBMB2010

# ASBMB

Annual Meeting

# BINGO!

# today

April 2010

To play, simply print out this bingo sheet and attend the ASBMB annual meeting.

Mark over each square that occurs throughout the meeting.

The first one to form a straight line (or all four corners) must yell out to win!



ASBMB ANNUAL MEETING

## BINGO

Stopped by the ASBMB booth (#603)	Witnessed laptop malfunction during talk	Posted tweet with hashtag #asbmb2010	Networked at minority reception	Got free ASBMB meeting compendia
Presented a poster	Got lost in convention center	Talked with JBC editors at lunch	Attended an award lecture	Asked a question at thematic session
Found typo in a symposium slide	Visited exhibits and got free stuff	<b>FREE</b> Got April ASBMB Today	Bought an ASBMB T-shirt	Saw someone fall asleep at a lecture
Uploaded electronic poster	Finished the fun run	Attended proteomics workshop	Ate lunch outside and got a sunburn	Watched "Naturally Obsessed" movie
Got free food at thematic reception	Learned about science careers	Attended women scientists reception	Danced with adviser at opening reception	Registered for 2011 annual meeting

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# 2010 ASBMB Special Symposia

Abstract Submission  
and Registration  
Opening Soon!

# Calendar of EVENTS

September 30 – October 4, 2010

## Transcriptional Regulation by Chromatin and RNA Polymerase II

Granlibakken Resort, Tahoe City, CA

Organizer: Ali Shilatifard  
Stowers Institute for Medical Research

October 14 – October 17, 2010

## Biochemistry and Cell Biology Of ESCRTs in Health and Disease

Snowbird Resort, Snowbird, UT

Organizer: James Hurley  
National Institute of Diabetes and  
Digestive and Kidney Diseases

Phyllis Hanson  
Washington University School of Medicine

October 21 – October 24, 2010

## Post Translational Modifications: Detection and Physiological Evaluation

Granlibakken Resort, Tahoe City, CA

Organizer: Katalin Medzihradzky  
University of California, San Francisco

Gerald Hart  
Johns Hopkins University School of Medicine

October 28 – October 31, 2010

## Biochemistry of Membrane Traffic: Secretory and Endocytic Pathways

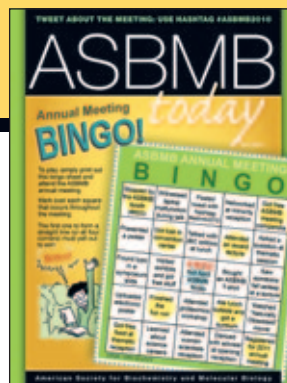
Granlibakken Resort, Tahoe City, CA

Organizer: Suzanne Pfeffer  
Stanford University School of Medicine

Vivek Malhotra  
Center for Genomic Regulation, Barcelona, Spain

[www.asbmb.org/meetings](http://www.asbmb.org/meetings)

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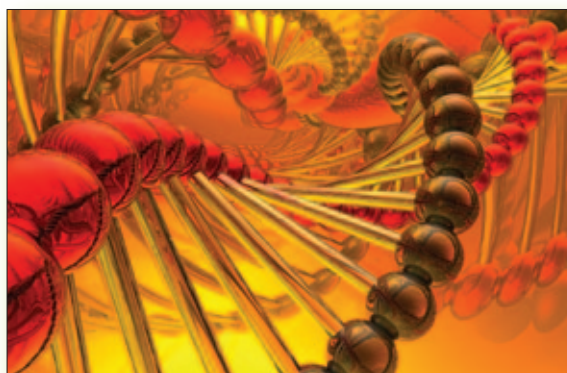
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### asbmb today online

In this month's podcast, you can hear JBC Associate Editor Dale Benos talk about a new thematic minireview series he is coordinating on the biochemistry of hypertension.

**To hear this and other podcasts, go to  
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## Advice and Dissent

### Dear Editor,

I would start by saying that “El Presidente’s” messages are one of the reasons I browse ASBMB Today. I not only find myself generally in agreement with the opinions expressed in his messages on various subjects, but I also enjoy his refreshing outspokenness on controversial issues (such as on the financial crisis and big pharma, ASBMB Today, May 2009) and his tendency to tell the truth to power (i.e., his critiques of the former U.S. administration). I was, therefore, surprised to see coyness and a nod about the actualité politique from the United Kingdom — namely the dismissal of the chief of the Advisory Council on the Misuse of Drugs (ASBMB Today, Dec. 2009). This particular case, in my view, is an issue of academic freedom. It ought to be an important freedom, particularly for scientists who advise politicians, and, in my view, distinguishes them from being perceived as politicians.

The purpose of my letter is not to defend David Nutt, who, I am sure, is more than capable of his own defense. I also do not wish to speculate on why the home secretary of the United Kingdom government decided Nutt was surplus to requirement. I am writing because I disagree with the implication of the president’s message that somehow there are clear dividing lines between scientific assessment and policy advice, particularly when the public perception of risk and risk assessment are under consideration.

The reasons given for sacking Nutt are in the public domain: publication of an academic lecture given to the Center for Crime and Justice Studies at Kings College, London, in July 2009. Nutt gave the lecture in his capacity as an expert in the area of drug misuse and

harm — ironically one of the main reasons he was chosen to head the ACMD. According to the now ex-chief of the ACMD, he got approval of both the lecture slides and text from the relevant government department (<http://bit.ly/cGo8UV>). The lecture was in the public domain in July 2009, and the sacking did not occur until it was published as a briefing pamphlet by the organizers at the CCJS in October 2009 (which, I guess, if it had not been at the center of the sacking, would have been read by fewer readers than those of ASBMB Today).

The transcript (<http://bit.ly/cfWVoD>), which is not bedtime reading, is evidently meant for connoisseurs and the highly referenced. It appears that the assessment that Nutt had delved into policy and politics rather than sticking to science (a judgment both the home secretary and Petsko seem to arrive at) is the result of the last paragraph of the lecture:

“Another key question we have to address as a society is whether our attitude to drugs is driven because of their harms or are we engaging in a moral debate? One thing this government has done extremely well in the last ten years is to cut away much of the moral argument about drug treatments. They have moved in the direction of improving access to harm-reduction treatments, an approach that, I think, is wholly endorsed by the scientific community and by the medical profession. For reasons that are not clear, the same evidence-based change has not happened in relation to the classification of drugs of misuse. I think it should happen, because, while I’m not a moral philosopher, it seems to me difficult to defend a moral argument in relation to drugs if you don’t apply it to other equally harmful activities.”

In the context of a lecture that purports to identify and compare various risks and harm (including devising a



drugs harm ranking), and the audience to which it was delivered, I leave it to the readers of ASBMB Today to decide if the offending paragraph is reason enough to justify having an “agenda,” as Petsko suggests. The debate about risks afflicting modern existence is fraught with irrationality and politics. It could do without sane, rational men advocating for more of its politicization. I would finish by quoting from the condemned man’s lecture: “I think we need to improve the general understanding of relative harms. I think we need to educate people about drug harms in relation to the harms of other activities in life, so that it is possible for them to make sensible decisions about relative harms.”

*Aamir Ahmed*  
University College London

## Engaging the Public

### Dear Editor,

A recent article in the Texas Tribune reported on a survey revealing that 51 percent of Texans don’t believe in evolution, and 30 percent believe that dinosaurs and humans lived at the same time. Ignorance of basic scientific principles has been a national problem for generations, and it isn’t getting any better. Willingness to embrace the mystical to explain natural phenomena seems to be on the increase.

I think that we scientists are to blame for much of this lack of scientific understanding. We take the taxpayers’ dollars and have a lot of fun doing great science, but we seldom take the time to tell the taxpayers what we have learned in language that they can understand. Most people do not understand what science is, let alone what it is not, and they do not understand the fundamental difference between

scientific and religious thought.

I feel that we should be doing something to engage the public, to let them know about the excitement and fascination of science. If every college and university in the country were to develop a lecture series focused on science for the public, it would advance our cause enormously.

Here, in inland Southern California, where I landed 18 months ago, religious conservatives make up a significant percentage of the population. Shortly after arriving, I challenged our faculty members to develop a five-lecture series on the science of evolution. The faculty members initially were concerned that the public would either torch the campus or just not show up. They wanted to hold the lectures in a small classroom since they were sure that no more than 20 people would attend. I insisted that we use the university theater, which seats about 500. As it turned out, the series was standing-room-only — people literally filled the aisles — at all five lectures. No creationists made grandstand appearances. Our only demonstrators were a group of atheists who showed up expecting a fight (wanting to help us, I suppose).

The series was so popular that it is being replayed this year at our Palm Desert campus. I went to one lecture; once again, the room was completely full of people wanting to learn. It was inspiring. This spring, we are doing a series on global climate change. Again, we will have five lectures on topics ranging from “how we know what we think we know” to “how will agriculture adapt to the changes that we predict.”

The core of these series is the science. No magic, no big words, just simple logic. Intelligent but uninformed people can understand this stuff. We are particularly trying to draw in science teachers from the local school

districts, to give them the information they need to make science current and relevant to their students. I believe that it is incumbent upon us to engage the public in this dialogue. In our experience, the faculty members are elated to engage in this sort of outreach, and, in our neck of the world, at least, we are having great success.

*Thomas O. Baldwin*  
Dean, College of Natural and  
Agricultural Sciences  
University of California, Riverside

### Erratum:

The final paragraph in the March Lipid News article “The Unmasking of Plasmalogens: Chlorinated Lipids” contains some factual errors. The corrected paragraph should read:

“In the future, we should consider the significance of the accumulation of chlorinated lipids produced in humans due to environmental exposure to RCS (e.g., cleaning with bleach and exposure in swimming pools). Additionally, another oxidant cannon is fired as hypobromous acid by eosinophils and their peroxidase. Yes, parallel pathways exist for brominated lipid species produced by activated eosinophils. Furthermore, check out the ingredients of some soft drinks and sports drinks that include brominated vegetable oil. Not only do we produce these halogenated lipids as a result of the cannons of the innate immune system, but we are likely marching through this battlefield with self-inflicted daily environmental and nutritional exposure to reactive halogenating species and their halogenated lipid products.”

## Lost in Translation\*

BY GREGORY A. PETSKO



**F**rancis Collins, the director of the National Institutes of Health (who, I might add, has got off to an excellent start), made a somewhat provocative remark after assuming his new position last year. Interviewed for *The New York Times* in October (Oct. 5, 2009; <http://nyti.ms/ciAg9g>), Collins is quoted as saying, “We’re not the National Institutes of Basic Sciences; we’re the National Institutes of Health.” This remark came in the context of Collins’ declared wish to encourage academic researchers to consider commercializing their ideas or pursuing drug development in universities, given the increasingly barren state of pharmaceutical company labs.

This reminded me of an article I read some time ago, with which I largely agreed, but which made me hopping mad at the same time. It was “Big Biology Is Here to Stay” by Steven Wiley, a Pacific Northwest National Laboratory fellow and director of PNNL’s Biomolecular Systems Initiative, and appeared in *The Scientist* (<http://bit.ly/9VMosr>). Subtitled “Why R01-funded Biologists Should Throw Their Support behind Large-scale Science Projects,” the premise of the article was that “The business of the National Institutes of Health is to fund research that improves people’s health, not fund our personal research projects.” In the article, Wiley confesses that he originally thought the Human Genome Project would be a waste of money but now thinks “we were all wrong.” He goes on to say that “Starting new, large-scale research projects was a clear demonstration that NIH was willing to try new approaches to accelerate biomedical research... trying to shift funds away from these large projects will ensure that they do fail, and will be self-defeating in the long run. We’d better hope these projects are successful, and we should do all we can to help them.”

Now, given my well-known views on the ascendancy of big science over little science and the increasing tendency to direct research from the top down by bureaucratically initiated programs, you may be wondering why I say that I largely agree with Wiley’s sentiments. The reason is that neither Wiley’s column nor Collins’ remark really was about big science in the sense that I mean it. I dislike large-scale, top-down programs; they are referring to projects aimed at translating the findings of

biomedical research into therapies for human disease. Many of the big science projects that I regard as not worth continuing, like the structural genomics initiative, aim to advance fundamental knowledge rather than produce direct health benefits, and many of the others, like the effort to associate common genomic polymorphisms with risk for disease, are simply not likely to produce significant health benefits no matter their intentions.

I have no problem with good science, whether it’s large or small, although, I do believe we always must have both sizes and that research driven by the curiosity of the individual investigator should be the predominant kind we support. I agreed with Wiley (and Collins), because they were, in fact, making a case for good science aimed directly at finding cures versus science aimed at expanding our basic knowledge of biology — in other words, translational research versus basic research. And, that is also precisely why the Wiley article (and the Collins remark) made me angry. It wasn’t what they said. It was the way they chose to talk about it.

I hate translational research. Now, before you either applaud or burst a blood vessel, you should know something else: I also hate basic research. Or, to be precise, I hate the terms “translational research” and “basic research.” If there’s a theme, besides the transformative nature of the age of genomics, that runs through the columns I’ve written for the past 10 years, it’s that the words we use to describe something are incredibly important and often get us into all kinds of trouble. We should never have used “therapeutic cloning” to describe somatic cell nuclear transfer; having the word “cloning” in there allowed religious fundamentalists to define the terms of the debate about embryonic stem cells. We should not have let the term “chemical” become a pejorative. “Global warming” is a poor phrase to rouse people to change their ways of life — “climate crisis” might have been much better (and also would have had the virtue of being alliterative). But, of all the poorly chosen words in recent scientific history, few are as bad as “translational research” and “basic research.”

How did we allow this purely artificial distinction to



dominate our discussion of funding priorities? It's everything we should avoid. It sets up a dichotomy that is bound to confuse the public; it divides us into two warring camps, competing for attention and resources; and it implies, falsely, that there may be a difference in value in the kind of work that we do based on its intent.

We should make this our mantra as life scientists: There is no such thing as basic research and no such thing as translational research. There is only research. Period. If we must put an adjective in front of it, then let's use "biomedical." But we simply have to stop talking about our science as though there were different versions of it, with different objectives and different implicit worth.

Do you really think that what is called basic research could exist if the public and its elected officials did not believe they would ultimately derive some benefit from it? And what would translational research have to translate if no new fundamental discoveries were made? These two feuding city-states need each other and ought to be united in common cause against the invading empire of ignorance, superstition and anti-intellectualism. But more than that: They shouldn't be separate states in the first place.

We simply have to stop talking about research as though there were two kinds. There aren't. When we start to use those divisive terms, we have to check ourselves. When a scientific official like Collins uses them, we have to urge him not to do so. And we have to make peace within our own community, with both sides in the current dispute recognizing not only that they need each other to survive but that our enterprise is seamless — a continuum from the most basic discovery to its most practical application. If Barnett Rosenberg hadn't wondered what would happen to *Escherichia coli* cells when they were placed in an electric field, we never would have known that cisplatin, which doesn't have a single atom of carbon in it, was a drug that could block cell growth and division. But if a number of other scientists hadn't worked with him to follow the implications of that observation and test cisplatin on cancer models in animals, and then to fight for its eventual testing on people, testicular cancer would not be a curable disease, and Lance Armstrong probably would be dead. There is no basic research and no translational research; there is only research, in all of its frustrating, expensive, confusing magnificence. Why should we take one of the greatest monuments to the human spirit and turn it into the Balkans?

But, if you agree with me, and I hope you do, you are probably wondering, "Well how, then, can we explain to

the public that you have to support the Barney Rosenbergs of the world doing things just to satisfy their own curiosity to get the cures you want? At least the way Collins and Wiley talk about research, you can piggy-back support for basic research onto the flood of money coming in for translating discoveries into therapies. If you can't talk about the two parts of the enterprise that way, how do you get support for it at all?"

The answer, I think, is that we haven't been making the argument for the support of biomedical research as well as we could. Wiley is wrong when he says, "The business of the NIH is to fund research that improves people's health, not fund our personal research projects." The business of the NIH is to fund both, because they are the same thing. But how do we get that point across? Next month, I'll tell you. ∞∞∞

\*This article originally appeared in Genome Biology (2010) 11, 107 and was reprinted with permission from BioMed Central.

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## Life Sciences and the Issues of Our Time A Public Affairs Symposium You Won't Want to Miss

BY PETER FARNHAM

Continuing its tradition of staging a premiere symposium on a major public policy issue at each annual meeting, the American Society for Biochemistry and Molecular Biology's Public Affairs Advisory Committee has decided to go global at Experimental Biology 2010 in Anaheim, Calif., by sponsoring a symposium titled "Life Sciences and the Issues of Our Time."

The symposium's theme consists of recommendations from the National Research Council's report "A New Biology for the 21st Century: Ensuring the United States Leads the Coming Biology Revolution." The report, released this past fall, examined how recent technological and scientific advances in biological science and the growing interdisciplinary collaborations between scientists and engineers can be applied to solve major, interrelated and, heretofore, largely intractable problems confronting a world with declining resources and a growing population.

The Public Affairs Advisory Committee has arranged a stellar lineup of speakers, starting with the symposium chair, Phillip Sharp of the Massachusetts Institute of Technology. Sharp, a Nobel laureate, was co-chair of the NRC report. (The report's other co-chairman, Keith Yamamoto of the University of California, San Francisco, is a member of the Public Affairs Advisory Committee and a longtime public citizen of science, serving on numerous National Institutes of Health, scientific society and NRC panels.)

Other speakers include:

- **Nina Fedoroff**, a plant biologist at The Pennsylvania State University and longtime ASBMB member, who currently serves as science and technology adviser to U.S. Secretary of State Hillary Clinton. It also was announced recently that Fedoroff is president-elect of the American Association for the Advancement of Science.
- **Catherine Woteki**, a former senior official in the U.S. Department of Agriculture during the Clinton administration, who is now a senior executive with Mars Inc. and is an active member of the American Society for Nutrition.
- **Gary Stacy**, a plant biologist at the University of Missouri, who chairs the public affairs committee of the American Society of Plant Biologists and the Department of Energy's Biological and Environmental Research Advisory Committee.

A fourth speaker is being recruited; please visit the ASBMB meeting Web site or the ASBMB Today Web site for an update.

The NRC report focused on food, the environment, energy and human health. The ASBMB symposium will examine ways to meet the challenges outlined in the report:

- **Generate food plants to adapt and grow sustainably in changing environments.** The result will be a body of knowledge and new tools, technologies and approaches that will make it possible to adapt all sorts of crops for efficient production under different conditions, which would help feed a growing world population.

- **Understand and sustain ecosystem function and biodiversity in the face of rapid change.** More knowledge and new tools and technologies are needed to understand how ecosystems function, to measure ecosystem services, to allow their restoration if damaged and to minimize harmful impacts of human activities and climate change. An integrated approach is needed, involving biology, ecology, climatology, hydrology, soil science; environmental, civil and system engineering; mathematical modeling techniques and computational science. This integration could generate breakthroughs in monitoring ecosystem function, identifying ecosystems at risk and developing effective interventions to protect and restore ecosystem function.

- **Expand sustainable alternatives to fossil fuels.** Making efficient use of biomass to make biofuels is a systems challenge, and this is another example of an area in which the New Biology can make a critical contribution. At its simplest, the system consists of a plant that serves as the source of cellulose and an industrial process that turns the cellulose into a useful product. There are many points in the system that can be optimized. The New Biology offers the possibility of advancing the fundamental knowledge, tools and technology needed to optimize the system by tackling the challenge comprehensively.

- **Understand individual health.** The goal of a New Biology approach to health is to make it possible to monitor an individual's health and treat any malfunction in a manner that is tailored to that individual. Between the





starting point of an individual's genome sequence and the endpoint of an individual's health is a web of interacting networks of staggering complexity. The New Biology can speed up fundamental understanding of the systems that underlie health, help develop tools and technologies that will lead to more efficient development of therapeutics and enable individualized, predictive medicine.

The symposium will be held from noon to 1:30 p.m., Sunday, April 25, in room 304A of the Anaheim Convention Center. ☺☺☺

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Peter Farnham (pfarnham@asbmb.org) is director of public affairs at ASBMB.



## Renewing America COMPETES

BY KYLE M. BROWN

In 2007, Congress passed a landmark package of legislation, known as the America COMPETES Act, to strengthen the nation's competitive position by stimulating scientific research and education. The provisions redefined the roles of several federal science agencies.<sup>1</sup>

Although many of the COMPETES Act programs are just beginning, the House Science and Technology Committee already has begun the process of reauthorizing the legislation before it expires at the end of 2010. Hoping to improve upon the previous bill, the committee has held numerous hearings since January on various aspects of COMPETES, including its impact on the economy, science education and infrastructure.

### Economic Impact

There appears to be broad consensus among members of Congress that COMPETES is contributing positively to America's economic competitiveness. In testimony before the committee on Jan. 20, business leaders expressed their support for the legislation.<sup>2</sup>

"The America COMPETES Act absolutely is vital to ensuring future U.S. innovation leadership and prosperity and security for America's workers," said John Castellani, president of Business Roundtable.

Business leaders emphasized the importance of provisions that would allow for the doubling of the budgets of key science agencies.

John Engler, president and chief executive officer of the National Association of Manufacturers, said that doubling federal funding for the National Science Foundation, National Institute of Standards and Technology and the Department of Energy's Office of Science would create jobs by building the infrastructure necessary for cutting-edge science and by funding grants that help spur innovation.

### Education

Business leaders also emphasized the importance of COMPETES in promoting education in science, technology, engineering and math, or STEM.

By focusing on increasing the number of American students proficient in STEM, “this legislation is moving America in the right direction,” said Thomas J. Donohue, president and chief executive officer of the U.S. Chamber of Commerce, on Jan. 20.

During a subsequent hearing on Feb. 4, education experts agreed but recognized the challenges facing STEM education.<sup>3</sup> Richard Stephens, senior vice president for human resources at Boeing and chairman of the Aerospace Industries Association work force-steering committee, described the attrition of students from undergraduate STEM majors and highlighted the dearth of qualified candidates for science and engineering jobs.

But, there was no clear consensus about the solution to STEM education woes.

Noah Finkelstein, associate professor of physics education research at the University of Colorado at Boulder, said that traditional models of classroom education are no longer appropriate. Although researchers now know how to improve student learning, new practices are not widespread, and more research is needed to disseminate educational reforms, Finkelstein said.

Robert Mathieu, director of the Center for the Integration of Research, Teaching and Learning at the University of Wisconsin-Madison, advocated for the integration of research and teaching in undergraduate

and graduate education. Specifically, he acknowledged the NSF’s faculty early-career development program, known as CAREER, which provides awards for early-stage faculty members who successfully integrate research and teaching.

## Infrastructure

According to senior officials from major research institutions, America’s competitiveness also is suffering because of declines in research infrastructure at universities.<sup>4</sup>

“Our nation’s research universities are falling behind in their ability to provide the physical infrastructure” that is vital to research, said Leslie Tolbert, vice president for research at University of Arizona.

During the committee’s hearing on university infrastructure Feb. 23, U.S. Rep. Daniel Lipinski, D-Ill., said universities are deferring \$3.5 billion in needed renovations. Tolbert and other officials concurred, listing hundreds of millions in needed facility updates at each of their institutions and detailing their effects on research.

The NSF provides limited support for university infrastructure through programs like the Major Research Instrumentation program,<sup>5</sup> but concern for an expanded federal role in providing for research infrastructure was expressed on both sides of the aisle.

Noting that the NSF’s expertise was in supporting peer-reviewed, basic research, U.S. Rep. Vernon Ehlers, R-Mich., said that it was not clear that agencies like the NSF had the knowledge to judge proposals for specialized facilities.

## Going Forward

Reauthorizing America COMPETES is the committee’s top legislative priority,<sup>6</sup> and Chairman Bart Gordon, D-Tenn., said he aims to pass the legislation through the House by Memorial Day. Using input from the witnesses at these and other hearings, “the new legislation is likely to include new programs and policy direction at NSF, NIST and other agencies relating to transformative research innovation, commercialization and manufacturing,” the committee said in a statement. XXXX

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Kyle M. Brown (kmbrown@asbmb.org) is an ASBMB science policy fellow.

### FOOTNOTES

1. <http://bit.ly/bdX88v>
2. <http://bit.ly/9MgrfF>
3. <http://bit.ly/diZGsK>
4. <http://bit.ly/b45Avh>
5. <http://bit.ly/aKNne9>
6. <http://bit.ly/dgVKKL>

## Highlights from the Blotter

The American Society for Biochemistry and Molecular Biology Policy Blotter posts regular news and commentary about current science-policy issues. Below are some recent highlights. You can read more at <http://asbmbpolicy.asbmb.org>.

- **University Infrastructure: Declines and Dollars** (<http://wp.me/pFLHF-3r>) During the House Science and Technology Committee’s hearing Feb. 23, senior officials from major research institutions highlighted declines in research infrastructure at universities.
- **Help Wanted: Federal Science Policy Leaders** (<http://wp.me/pFLHF-3n>) In recent weeks, several prominent leaders in the science-policy community have announced they will be leaving their positions.
- **Former FASEB Staffer to Join NIH Leadership** (<http://wp.me/pFLHF-3w>) Pat White, former director of legislative relations for the Federation of American Societies for Experimental Biology, has been appointed associate director for legislative policy and analysis at the National Institutes of Health. XXXX

# Report Finds Summer Research Is a Positive Experience

BY JENNIFER A. HOBIN

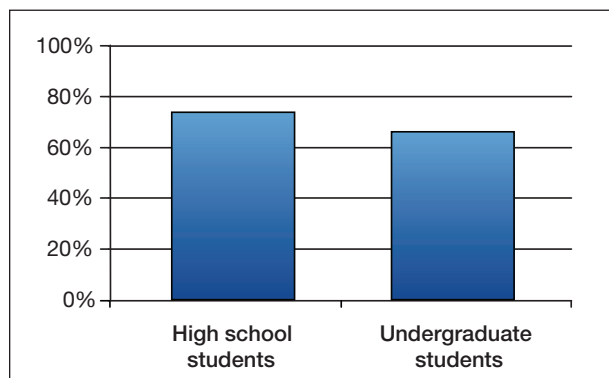
The Federation of American Societies for Experimental Biology recently released a report highlighting the outcomes of an American Recovery and Reinvestment Act-funded National Institutes of Health summer research program that enabled NIH-funded investigators to provide hands-on research opportunities to thousands of students and science teachers across the country. The report, “Stimulating Science Education: NIH Summer Research Program Engages Students and Teachers in Science,” is based on a survey of more than 600 students and teachers. It found that, in addition to creating jobs and advancing research, the program encouraged students to pursue health-science careers and provided learning and professional development opportunities to science educators.

The primary goal of the Recovery Act was to jumpstart the economy by creating and preserving jobs while advancing national priorities, such as improving health and education. NIH allocated \$28 million of its ARRA funds for the Summer Research Experiences for Students and Science Educators program, funding nearly 3,000 summer jobs in 2009, including positions for 427 high school students, 2,132 college students and 399 science teachers.

Students report being able to participate in a variety of activities, such as presenting research at conferences and writing research reports for publication. Roughly half of the undergraduates received advice about scientific careers or attending graduate school.

Both college and high school students reported that it taught them what a career in research is about, strengthened their research and laboratory skills and broadened their understanding of scientific literature. The opportunity also boosted their self-confidence and their ability to work independently.

More than three-quarters of high school student respondents planning to major in science reported that their summer research experience played an important role in that decision (Figure 1). Likewise, 66 percent of undergraduates planning to pursue master’s or doctoral degrees in science indicated that their research



A majority of high school and undergraduate students indicated that their summer research experience played an important role in their decision to further their science education.

experience was an important factor in that decision.

Many teachers said they expected to be able to integrate what they learned during the summer into their teaching by creating new or revised educational content and hands-on learning activities, introducing new technologies into their labs and classrooms and raising educational standards. They said the experience also gave them more confidence in discussing science careers and related jobs with their students.

Science educators also expected the program to benefit them professionally by expanding their network of scientists and educators, helping them to identify additional scientific and educational opportunities and preparing them for new leadership responsibilities in their school districts. The vast majority of teachers who responded to the survey reported that they were likely to pursue another research opportunity if given the chance. XXXX

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## For more information:

To read FASEB’s full report, go to <http://bit.ly/bylrre>.



# ASBMB Journal Innovations

BY SARAH CRESPI

This winter, the American Society for Biochemistry and Molecular Biology's Journal of Lipid Research and Molecular and Cellular Proteomics both received new homepages, and several new features appeared on their Web sites. The Journal of Biological Chemistry's Web site underwent major changes in the fall and continues to evolve.

## JLR Adds Collections

In the JLR, you can find new collection pages, such as Thematic Reviews, Methods Papers, Commentaries and Patient-oriented Papers. The journal's past series, such as the 50th Anniversary Compendium, and ongoing thematic series also have a new home at [www.jlr.org/collections](http://www.jlr.org/collections). You also can see the JLR-sponsored lectures from 2009 and upcoming lectures for 2010 at [www.jlr.org/home/about](http://www.jlr.org/home/about). The journal will undergo updates at the article level later this spring. For a sneak peek at the changes in store for the JLR Web site, see the latest changes to the MCP Web site below.

## MCP Switches Platforms

MCP got more than just a facelift. In conjunction with its online-content host, HighWire, MCP has overhauled its Web site to improve navigation and the user experience.

Behind the scenes, we have updated the content encoding to XML, which allows for more nimble transitions between displays and meets international standards for accessibility.

The articles and table of contents pages offer several new features:

- Abstract preview: "Mouse-over" the table of contents and search results pages and get an instant pop-up preview of the article abstract – without leaving the page.
- Figure expansion: Figure and table thumbnails can be enlarged from within the article.
- Tag-along navigation: The navigation box follows alongside as the reader scrolls down the article page.
- Easier scanning and reading: Better positioning of the title

and abstract, improved fonts and formatting plus quick previous/next links to scan by article section make it easy to cover an article quickly.

- Reference preview: Hover over a numbered reference in the full text of an article and get a quick look at the cited author and publication date.

Readers also will find it easier to access MCP's special collections, which are now linked from the top of all pages in the Web site.

MCP became an online-only journal in January 2010. Issues and articles are available as print-on-demand packages. MCP's online-only format has opened up a new era for the journal's cover. Currently, the journal has an animated cover image. In the future, the options may expand to include interactive graphics.

## JBC Changes TOC and More

The JBC's new table of contents categories are now live. You can learn more about these changes in the article

"JBC: A Call for Papers and a Modest Course Adjustment" in the January issue of ASBMB Today. The new sections are listed here: <http://bit.ly/cUbGBY>.

In response to the increasing interdisciplinary nature of research, authors also can select more than one section heading for an article. If you'd like to keep up with your favorite topic, you can subscribe to RSS feeds of the new JBC sections through the

JBC site or through Amazon for the Kindle. (Search the Kindle store for "JBC.")

Finally, the JBC now allows authors to use non-Latin characters for their names in article PDFs. (See an example at <http://bit.ly/9WPr39>.) Only characters that can be encoded in Unicode, such as Chinese, Japanese, Korean and Arabic, are acceptable. At this time, these characters are not displayed in the HTML version of the article. ㄨㄨㄨㄨ



Sarah Crespi ([screspi@asbmb.org](mailto:screspi@asbmb.org)) is a multimedia communications specialist at ASBMB.

# ASBMB Announces Diversity in Science Award

BY NICOLE KRESGE

**T**he American Society for Biochemistry and Molecular Biology recently announced the creation of a Diversity in Science Award for 2011.

According to the ASBMB Minority Affairs Committee, which established it, "the award will be given to an outstanding scientist who has shown a strong commitment to the encouragement of underrepresented minorities to enter the scientific enterprise and/or to the effective mentorship of those within it."

The annual award will consist of a plaque, a cash prize and transportation expenses to present a lecture at the ASBMB annual meeting. The recipient, who need not be an ASBMB member, will be selected by the Minority Affairs Committee. Although the recipient can be from any racial or ethnic background, the committee hopes that many candidates and future recipients will be from backgrounds underrepresented in the science, technology, engineering and mathematics fields, serving as

instant role models to young scientists.

"As we enter the new millennium and appreciate the abundance of scientific progress made during the last century, we must take heed that the extent of participation in the scientific enterprise by certain groups is regrettably far below the level commensurate with their representation in the general population," the Minority Affairs Committee said in a statement. "This lack of representation, of course, is unhealthy for the prosperity and best interests of our country, as well as for science in general. We recognize that the ability to engage this underrepresented sector of our work force will require, among other interventions, proper mentorship, particularly by those with whom this sector shares close ethnic or cultural ties." XXXX

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Nicole Kresge (nkresge@asbmb.org) is the editor of ASBMB Today.

## Join Us at the MINORITY SCIENTIST WELCOME RECEPTION

Sunday, April 25, 6:00 PM - 8:00 PM  
Hilton Room Palos Verdes

**New schedule!** This year, the ASBMB Minority Affairs Committee is hosting a Welcome Reception on Sunday evening, following the afternoon symposia. PI's, industry professionals, educators, young professionals and students are welcome to attend this networking and mentoring reception.

Become part of the  
**PARTNERSHIP FOR DIVERSITY**  
A Registry Sponsored by the ASBMB Minority Affairs Committee  
[www.asbmb.org/MACRegistry](http://www.asbmb.org/MACRegistry)

# Retrospective: Philip Siekevitz (1918–2009)

BY NICOLE KRESGE

**P**hilip Siekevitz, a pioneer in cell biology and a professor emeritus at The Rockefeller University, passed away Dec. 5 at age 91.

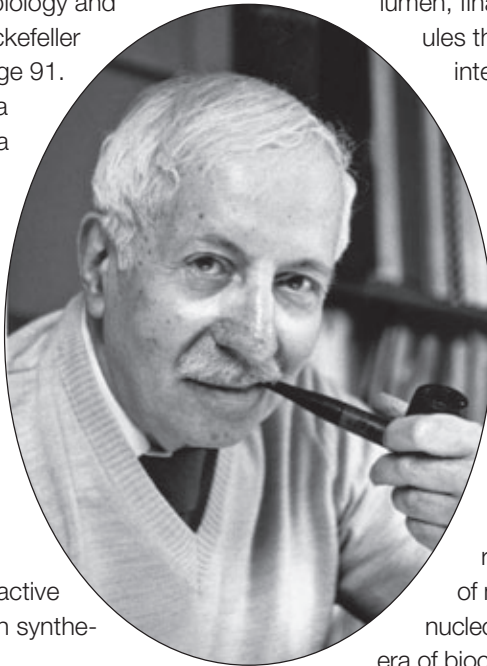
Siekevitz was born in Philadelphia (1918) and attended the Philadelphia College of Pharmacy and Science. He became interested in biochemistry and wanted to go to graduate school, but he was drafted into the Army in his final year of college. He managed to defer for a year and graduated in 1942.

After almost four years of service, Siekevitz enrolled at the University of California, Berkeley. Working with David Greenberg, he studied amino acid metabolism and became one of the first to use radioactive amino acids to look at in vitro protein synthesis using cells and tissue slices.

Siekevitz earned his doctorate in biochemistry in 1949. He then joined Paul Zamecnik's laboratory at Harvard's Massachusetts General Hospital, where he collaborated with Fritz Lipmann, studying mitochondrial biochemistry. While at Harvard, Siekevitz was among the first to use subcellular fractions, microsomes, mitochondria and nuclei to look at protein synthesis. Previously, this was done with whole homogenates or tissue slices. His work at Mass General played an early role in Zamecnik's successful development of a system for cell-free protein synthesis.

In 1951, Siekevitz became a postdoctoral fellow in Van R. Potter's laboratory at the University of Wisconsin, Madison, where he studied the regulation of energy metabolism in mitochondria.

Three years later, George Palade invited Siekevitz to work with him at Rockefeller University. He and Palade spent the next 20 years as colleagues. The pair first studied the pancreas as a system for protein synthesis and secretion and, using radioactive amino acids, showed that the secretory enzymes of the pancreas were first synthesized on ribosomes and then transported across the endoplasmic reticulum membrane into the organelle's



lumen, finally appearing in the zymogen granules that were secreted into the lumen of the intestine.

Next, Siekevitz and Palade became interested in membrane formation and found that various microsomal enzymes had different time courses of appearance in the endoplasmic reticulum. They demonstrated that there is a turnover of enzymes in the endoplasmic reticulum, with each protein having a characteristic half-life. From this, they inferred the presence of a substructure where newly synthesized enzymes were deposited.

Also, with Rachele Maggio, they carried out the first systematic fractionation of nuclei, leading to a clean separation of nucleoli and nucleoplasm that enabled a new era of biochemical investigation of the nucleus.

As an independent member of the Rockefeller faculty, Siekevitz changed the focus of his research to the nervous system and the events that occur at the neural synapse. By chance, he discovered postsynaptic density, a finding made a year earlier by Carl Cotman, and became convinced that the density represented a separate subcellular structure that underlies the postsynaptic membrane. For the next 16 years, Siekevitz and his colleagues incisively studied postsynaptic density, determining which proteins were attached to it. He retired from Rockefeller in 1988.

Siekevitz was elected to the National Academy of Sciences in 1975 and became the president of the American Society for Cell Biology in 1966 and president of the New York Academy of Sciences in 1976. He was an advocate of the social responsibilities of scientists and a founding member of the New York Scientists Committee for Public Information. He was also co-author of one of the first textbooks on cell biology, *Cell Structure and Function*, published in 1963. ∞∞∞

Nicole Kresge (nkresge@asbmb.org) is editor of ASBMB Today.

PHOTO COURTESY OF ROCKEFELLER UNIVERSITY.



# Retrospective: Marshall Nirenberg (1927–2010)

BY NICOLE KRESGE

**M**arshall Warren Nirenberg, a Nobel Prize-winning biochemist and geneticist, died Jan. 15. He was the first federal employee to win a Nobel Prize in physiology or medicine, sharing the honor in 1968 with Har Gobind Khorana and Robert W. Holley “for their interpretation of the genetic code and its function in protein synthesis.”

Nirenberg was born in New York City in 1927. Early on, he developed an interest in biology and attended the University of Florida at Gainesville, earning a Bachelor’s of Science in 1948 and a Master of Science in zoology in 1952. During this time, he also developed an interest in biochemistry, which influenced his decision to pursue a doctorate with James Hogg in the department of biological chemistry at the University of Michigan, Ann Arbor. Nirenberg received his degree in 1957.

After graduating, Nirenberg moved to Bethesda, Md., to work at the National Institutes of Health, where he would spend the rest of his scientific career. He first did a postdoctoral fellowship with DeWitt Stetten Jr. and William Jakoby at the National Institute of Arthritis and Metabolic Diseases. Then, in 1960, he became a research biochemist in the section of metabolic enzymes, headed by Gordon Tompkins. Two years later, he became head of the laboratory of biochemical genetics at the National Heart, Lung and Blood Institute.

Initially, Nirenberg studied sugar transport, glycogen metabolism and enzyme purification, but he soon changed his focus to protein synthesis. Working with plant physiologist Heinrich Matthaei, Nirenberg developed a system to observe protein synthesis *in vitro* and was able to demonstrate the existence of mRNA. The system also allowed him to determine that a sequence of three uracil bases in a row coded for the amino acid phenylalanine. It was the first demonstration of the existence of codons.

He presented his findings at the International Congress



of Biochemistry in Moscow in 1961, but his talk was largely ignored. Luckily, one of the audience members persuaded the conference leaders to let Nirenberg repeat his lecture in front of a larger audience, and, speaking before more than a thousand people, Nirenberg convinced the crowd his findings were legitimate.

Once he made his techniques public, Nirenberg set about figuring out more of the genetic code. But, he had dozens of codons left to decipher and was competing against larger, better-equipped labs. Faced with the possibility of helping the first NIH scientist win a Nobel Prize, many NIH scientists put aside their own work to help Nirenberg, and, by 1965, Nirenberg and his colleagues had created a 64-square table containing the genetic code.

Nirenberg continued to make significant discoveries in neurobiology and genetics, studying gene expression, stem-cell differentiation and nervous-system development. In addition to the Nobel Prize, he received many awards and honors, including the National Medal of Science in 1966 and the National Medal of Honor in 1968.

“Despite his reputation for modesty, Dr. Nirenberg inspired generations of students and scholars who devoted their careers to studying the ‘code of life,’ genetics and neurobiology,” said Francis S. Collins, director of the NIH. “He not only was a scientist’s scientist, but a mentor’s mentor. During his life, he was awarded virtually every high honor reserved for science and medicine. Just last fall, in an occasion marked by a symposium in his honor, the American Chemical Society designated Dr. Nirenberg’s work as a National Historic Chemical Landmark.” ☺☺☺

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Nicole Kresge (nkresge@asbmb.org) is the editor of ASBMB Today.

PHOTO BY N. MACVICAR, COURTESY OF THE NATIONAL INSTITUTES OF HEALTH.

## Corbett Appointed Chairman of Biochemistry



John A. Corbett has been appointed chairman and professor of biochemistry at The Medical College of Wisconsin. Prior to his appointment, Corbett was at the University of Alabama in Birmingham, where he was the Nancy R. and Eugene C. Gwaltney family-endowed chair in juvenile diabetes research as well as a professor of medicine and director of the comprehensive diabetes center.

Corbett's research is directed at uncovering the mechanisms responsible for diabetes development. His studies are focused on the mechanisms regulating metabolic function and health of insulin-secreting beta cells in the pancreas. Corbett's laboratory also is engaged in research focused on inflammation and the innate immune responses activated during a viral infection.

Corbett is also a member of the Journal of Biological Chemistry editorial board. XXXX

## Lefkowitz Wins Frontiers of Knowledge Award



Robert J. Lefkowitz, the James B. Duke professor of medicine and biochemistry at Duke University, has been awarded the BBVA Foundation Frontiers of Knowledge Award in Biomedicine. According to the foundation, he earned the award "for his discoveries of the seven transmembrane receptors (G protein-coupled receptors), the largest, most versatile and most therapeutically accessible receptor signaling system,

and of the general mechanism of their regulation."

Lefkowitz's work on G protein-coupled receptors, the largest and most pervasive family of cell receptors, began in 1982 with the identification of the gene for the  $\beta$ -adrenergic receptor, which helps regulate the body's fight-or-flight response by reacting to epinephrine. Shortly thereafter, he discovered seven additional adrenergic receptors. Those receptors — and all G protein receptors — share a basic structure in which the molecule weaves its way back and forth seven times across a cell's membrane. When the portion of the molecule that lies outside the cell connects with the receptor's favored signaling molecule, the internal portions of the molecule can trigger the appropriate cellular response. Lefkowitz is also a Howard Hughes Medical Institute investigator.

The BBVA Foundation supports knowledge generation, scientific research and the promotion of culture. Its awards are meant to recognize and encourage world-class research and artistic creation, prizing contributions of broad impact for their originality and theoretical significance. XXXX

## Frey to Give Hammes Lectureship



Perry A. Frey, professor emeritus of biochemistry at the University of Wisconsin-Madison Institute for Enzyme Research, has been selected to present the second Gordon Hammes American Chemical Society Biochemistry Lecture at the 2010 ACS national meeting in August. The lectureship recognizes an individual who has had a major impact on research at the interface between chemistry and

biology, particularly in the realm of biochemistry, biological chemistry, molecular biology and biophysics.

Frey has made numerous contributions to enzymology, including establishing the chemical mechanisms for the reactions catalyzed by uridine diphosphate galactose 4 epimerase and galactose 1 phosphate uridylyltransferase and developing methods for the synthesis of nucleoside pyrophosphorothioates with chiral [ $^{18}\text{O}$ ]-labeled phosphorothioate groups and using these chiral compounds to determine the stereochemical course of enzyme-catalyzed thiophosphoryl transfers. He also carried out important studies on the bond order and charge delocalization at phosphorothioates. And, his studies on the bacterial enzyme lysine 2,3-aminomutase provided critical insight into the mechanism of action of this member of the large radical SAM superfamily of enzymes.

Frey also served on the editorial board for the Journal Biological Chemistry from 1983 to 1988. XXXX

## Knox Inducted into Missouri Academy



James R. Knox, professor emeritus of molecular and cell biology at the University of Connecticut, is one of seven scientists recently inducted into the Missouri University of Science and Technology Academy of Chemistry and Biochemistry.

The academy was established in 2005 to continue the work of the former Foundation for Chemical Research, which was in existence from 1983 through 2005.

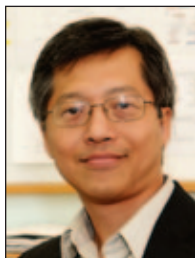
The foundation worked with the alumni of the Missouri University of Science and Technology chemistry department to support and enhance the research and teaching goals of the department. Members of the academy are scientists who have made outstanding contributions to their profession.

Knox, who received a Bachelor of Science from the University of Missouri-Rolla, specializes in physical biochemistry and molecular biophysics. He has published more than 100 journal articles or book chapters and has given more than 120 invited lectures and talks. Knox also served on the editorial board of the Journal of Biological Chemistry.

The other six inductees are Bryan E. Breyfogle, Nuran Ercal, Maciej Gazicki-Lipman, Janet Lynn Kavandi, James Stoffer Jr. and Glenn E. Stoner. XXXX



## Liao Honored with Two AIChE Institute Awards



James C. Liao, chancellor's professor of chemical and biomolecular engineering at the University of California, Los Angeles, received two major American Institute of Chemical Engineers awards. He was honored with the James E. Bailey Award for Outstanding Contributions to the field of biological engineering and the Alpha Chi Sigma Award for Chemical Engineering Research.

The James Bailey Award is given to an individual who embodies the spirit of James Bailey, one who is a pioneer, a mentor, an innovator, an integrator of biology and engineering, a teacher and one who has made a great impact on the field of biological engineering. The Alpha Chi Sigma Award is given for outstanding accomplishments in fundamental or applied chemical engineering research.

"Professor Liao epitomizes the modern chemical engineer who uses the power of microorganisms to do new, creative chemistry of consequence for the chemical and fuels industry," said Gregory Stephanopoulos of Massachusetts Institute of Technology and chair of the board for the Society for Biological Engineering, a technological community within the American Institute of Chemical Engineers. "His work has demonstrated how microbial biocatalysts can be engineered to catalyze bioconversions for the utilization of renewable resources, a major thrust of metabolic and biological engineering." XXXX

## Tzagoloff Garner's Thomas Hunt Morgan Medal



Alexander Tzagoloff, Alan H. Kempner professor of biological sciences at Columbia University, has been awarded the Genetics Society of America's Thomas Hunt Morgan Medal for lifetime contributions in the field of genetics.

Using yeast as a model system, Tzagoloff has defined the biogenesis and function of the mitochondrial respiratory chain. He was the first to systematically define the nearly 400 nuclear genes (referred to as PET genes) required for respiration in yeast. His work has not only influenced yeast researchers but has also affected research in human disease, apoptosis and cancer genetics. Through the years, he has developed an extensive collection of yeast strains that he has generously shared with colleagues worldwide.

The medal is named after Thomas Hunt Morgan, who received the 1933 Nobel Prize in Physiology or Medicine for his work with *Drosophila* and his "discoveries concerning the role played by the chromosome in heredity." The GSA established the medal in 1981 to honor this classical geneticist, who was among those who laid the foundation for modern genetics. XXXX

## Shapiro Receives Lifetime Achievement Award



Lucy Shapiro, director of the Beckman Center for Molecular and Genetic Medicine at Stanford University, is the recipient of the Abbott-American Society for Microbiology Lifetime Achievement Award. It is ASM's premier award for sustained contributions to the microbiological sciences.

Shapiro's three decades of work on *Caulobacter crescentus* has provided the most thorough understanding of the cell cycle in bacteria. Her research has shown that the cell is an integrated system with transcriptional circuitry that is interwoven with the three-dimensional deployment of key regulatory and morphological proteins. By using cell biology, molecular genetics, genomic analyses and molecular imaging, Shapiro and her co-workers have made significant advances in understanding three fundamental problems: the complete genetic network that controls bacterial cell cycle progression, how a dividing cell can produce two progeny with different cell fates and how subcellular structures are built at specific sites on the cell and at specific times in the cell cycle. Shapiro also discovered two master regulatory proteins, CtrA and GcrA, that are key components of a genetic circuit that drives cell-cycle progression and asymmetric polar morphogenesis in *C. crescentus*. XXXX

## Wente Named Vice Chancellor, Senior Associate Dean



Susan Wente has been named associate vice chancellor for research and senior associate dean for biomedical sciences at Vanderbilt University. In her new roles, Wente is working with faculty members to enhance communication and nurture the progress of Vanderbilt's research enterprise, while continuing her own research and teaching duties.

Wente, who is also professor of cell and developmental biology, studies the mechanisms involved in the highly selective, bidirectional exchange of proteins and RNA between the nucleus and cytoplasm. She uses yeast, cultured human cells and zebrafish model systems to address three broad questions: (1) How are nuclear pore complexes assembled? (2) How do proteins and genetic material move through the nuclear pore complex? And, (3) how does inositol polyphosphate signaling regulate vertebrate development? She and her collaborators have made breakthroughs in understanding the mechanisms of assembly, translocation through and regulation of nuclear pore complexes, as well as the basis of transport-factor interactions with the nuclear pore complex proteins. Lab members also have discovered a nuclear inositol polyphosphate pathway that is required for efficient mRNA export in both yeast and vertebrate cells. This signaling pathway represents a new frontier for regulating gene expression and cell physiology. XXXX



# The Graduate Student Experience, In Four Panels

BY NICK ZAGORSKI

**M**any people probably have sat through a less-than-thrilling class, lecture or seminar and found themselves doodling in their notebooks. For most, it provides a way to pass the time; for Jorge Cham, it paved the way to a new career — one that graduate students across the world appreciate.

For, as the man behind PHD Comics (PHD stands for Piled Higher and Deeper), Cham has helped codify the foibles and frustrations of academia as seen through the eyes of a group of hopeful, though at times hopeless, graduate students — workaholic and chocoholic Cecilia, the exceedingly clever yet exceptionally lazy Mike Slack-enery, the activist anthropologist Tajel and the perhaps autobiographical “nameless hero.”

Over the years, this former university comic strip has grown into a cult favorite in academic circles, letting students laugh at the eccentric world in which they work, but also giving them some perspective and helping them realize that they are not alone.

The beauty and appeal of the strip, which began running in October 1997, is that, although it’s ostensibly centered on engineering students (Tajel being the exception), the comic focuses on general situations to which any current or former graduate student — from anthropology to zoology — can relate. These include the joys of being a teaching assistant, how to scam free food, dating, explaining your project to your parents, trying to find a job and, of course, trying to write that pesky dissertation.

These, and other day-to-day experiences, are quite familiar to Cham. He spent many years producing PHD Comics while living the life of an academic, first as a graduate student at Stanford University, where he designed better robotic legs, and later as a postdoctoral fellow at the California Institute of Technology, where he studied neural prosthetics.

But, shortly after he arrived at Stanford in 1997, he happened to read that the student newspaper was looking to run a new comic strip; over dinner that night with his older brother, who was also a Stanford graduate student, and some of his friends, PHD Comics was born.



“We all thought a strip about graduate school would work, because it was an untapped area in pop culture,” Cham says. “And, even though I had only been in graduate school for a few weeks, the stories I heard from my brother and his friends told me that there was a lot of material to work with.”

Of course, Cham soon would learn that “material” first-hand, and those battle scars are reflected in PHD Comics’ incisively accurate portrayal of academic life.

Of all the “funny-because-it’s-true” elements in the comic strip, the most enduring, and the one that most resonates with readers, is the 600-pound gorilla known as the dissertation.

“Graduate school is a unique beast, because the dissertation process — which adviser to pick, what project to work on — is something students begin to cope with at Day 1, and yet, the end product is years away,” says Cham. “In between, you have this very flexible and open-ended schedule that can lead to students carrying around this sense of guilt. They think: Am I being productive enough?”



JORGE CHAM © 2007



WWW.PHDCOMICS.COM

Should I go to lab this weekend? What else can I do?"

And, with all that uncertainty, adds Cham, often comes procrastination.

The dreaded P-word takes many humorous forms in the comic, whether its Cecilia's overstressing to the point of becoming unproductive or Slackenrny's seemingly deliberate efforts to become the eternal graduate student.

Beneath the witty exterior, though, Cham hopes to show that such worries about finishing, which sometimes can even lead to thoughts of leaving graduate school altogether, are common and should be taken in stride as part of the long and winding doctoral-degree path.

"I always thought that was an important message, because, while the graduate-student life appears very social, with plenty of labmates and classmates around you, at the same time, trying to get a Ph.D. can be a very isolating experience, especially in the context of your dissertation," he says. "Because it comes down to just you and your adviser, and, if something goes wrong, it feels like it's just you. But, in truth, it's not."

In 2005, Cham also began taking his message directly to the people, embarking on the first of what would become a series of lectures across the globe. Combining stories about his comic with some general thoughts about life as a graduate student, the "Power of Procrastination" tour discusses the role of procrastination in the graduate-school process.

Cham's general belief is that procrastination is neither good nor evil; although, he certainly does not advocate that students procrastinate. "The message I try to convey is that there's nothing that you should feel you have to do in

terms of your progress, like, I have to spend so many hours a week in lab or get these results by the next lab meeting. Because, the truth is, discovery cannot be forced."

That truism can apply to both research findings and personal discovery, as it did for Cham. Although he has been an avid reader and collector of comic books his whole life, and he dabbled in sketching growing up, Cham never imagined a career as a cartoonist: Becoming an engineer, in fact, was his childhood dream.

Although Cham has been out of academia for a few years now — the growing success of PHD Comics, combined with increased travel due to his speaking engagements, eventually led Cham to forgo his research career, though with no regrets — fans have no reason to worry; not only does he still have plenty of his own personal graduate school experiences to draw from, but stories told on his Web site's forum page or by attendees at his lectures give him a continual supply of fresh ideas. And, Cham promises to keep going until he can't go anymore.

For the countless PHD Comics fans who can relate to the misadventures of these overworked and underpaid students, that's joyous news, even if each new comic gives them a way to procrastinate.

### Going Deeper into the Pile: A Conversation with Jorge Cham

**ASBMB:** Has anyone ever written you or come up to you after a lecture and mentioned that PHD Comics was the reason he or she decided to go to graduate school?

**CHAM:** Not really. The funny thing about the comics, I find, is that, although they resonate with almost any graduate

## Molecular Manga

While PHD Comics and other strips use illustration to poke a little fun at the world of science, comics also can be a powerful tool to help teach science, turning complex scientific terms and concepts into visual forms. That is the idea taken up by No Starch Press (<http://nostarch.com/index.htm>), a publishing company dedicated to, as it says, the finest in geek entertainment.

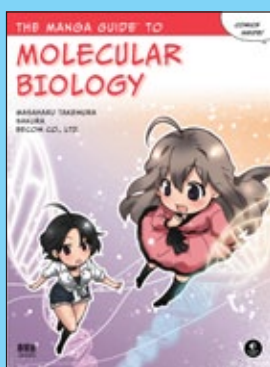
Founded in 1994, No Starch Press has primarily dedicated itself to computing, publishing numerous books that combine understandable explanations of complex terminology with personality, attitude and style.

Recently, though, it has taken its unique approach of instruction to the realm of science, with the help of manga — Japanese-style comics that are gaining popularity in Western culture, especially among younger readers. These illustrated tutorials have tackled subjects like calculus, statistics, physics and molecular biology.

The Manga Guide to Molecular Biology follows the exploits of Rin and Ami, who, as a result of skipping their molecular biology class all semester, are sentenced to summer school on Professor Moro's private island. Once there, Moro, his assistant Marcus and a special virtual-reality machine give the schoolgirls an up-close and personal tour of molecular biology in action.

Written by Masaharu Takemura, a lecturer at the Tokyo University of Science who has written several books about biology, *The Manga Guide to Molecular Biology* explores transcription, translation, mitosis, organelle function and even the new advances in genetic engineering — as told in an engaging, visual and story-driven format.

Learn more about *The Manga Guide to Molecular Biology* at [http://nostarch.com/mg\\_mbiology.htm](http://nostarch.com/mg_mbiology.htm).



student, they generally don't translate to individuals outside of academia. However, I did get an e-mail from a high school student who decided to go to college in part due to PHD. He thought that universities were only meant for lofty people, but he read my comic and realized that academics were regular people too, so he decided to apply. That e-mail was memorable, because one of my big motivations in developing PHD was to use it to portray scientists in an accurate light and not the stereotypes they often are in popular culture.

**ASBMB:** *What sort of questions do you get at your lectures? Has any question emerged as the most frequently asked?*

**CHAM:** One of the most common questions I get is, "What do you do for a living when you are not writing your comic?" I answer that I left research and do, indeed, do the comic full time. That generally leads to the very popular follow-up: "What did my professor think about my decision to draw comics full time?" So, I tell them that my postdoc adviser gave me very valuable advice. He said not to get caught up in artificial models of success; I could choose my own definition of success. That helped me make my choice to forgo my academic career.

**ASBMB:** *Speaking of that, during the time when you were still looking to advance in academics, did you worry that your work with PHD might hinder your chances? For example, employers might think you didn't like academia or couldn't devote your full time to your duties.*

**CHAM:** Yeah, it might have influenced some people's decisions, but I tried to look at it from the positive — that PHD would give people a chance to see my creative side. At the same time, I didn't concern myself with it too much, because I felt very comfortable with my achievements, research and publications, which I believed should be the main considerations in finding a job.

**ASBMB:** *Over 13 years, your characters have experienced a lot of growth, such as marriage, kids, even graduation. Do you have a big picture of how PHD will progress, or do you just take it one strip at a time?*

## Comic Contest

Want to try your hand at writing a comic? Come up with a new caption for this PHD Comics panel and submit it in the online version of this article at <http://bit.ly/dvGvKL>. The winner will receive an ASBMB T-shirt.



SERGE CHAM © 2008

WWW.PHDCOMICS.COM



**CHAM:** It's a little of both. I definitely do have a vision of where my characters are going and where they'll end up in life, but, because I don't have a planned ending date, it leads to a balancing act; I want to progress the story without ending the story. So, I frequently finish one strip and have no idea what the next one will say.

**ASBMB:** *Of all your strips, do you have a personal favorite?*

**CHAM:** Oh, that's like asking a parent to pick their favorite child. I think if I had a favorite comic strip I would have stopped writing long ago. So, that's one thing that keeps me going — chasing that elusive favorite. ∞∞∞

Nick Zagorski (nzagorski@asbmb.org) is a science writer at ASBMB.

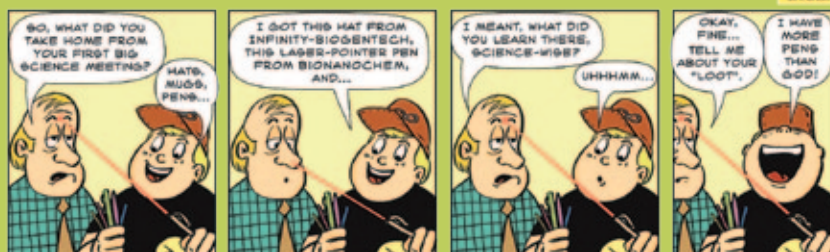
## The Online Science Comic Universe

Of course, PHD Comics is not alone in the online science comic universe; listed below are three other strips that have a scientific bent to their humor.

## Saturday Morning Breakfast Cereal www.smbc-comics.com

This comic, developed and drawn by Zach Weiner, features humorous one-off strips that poke fun at a variety of topics, including religion, dating, superheroes and of course, science.

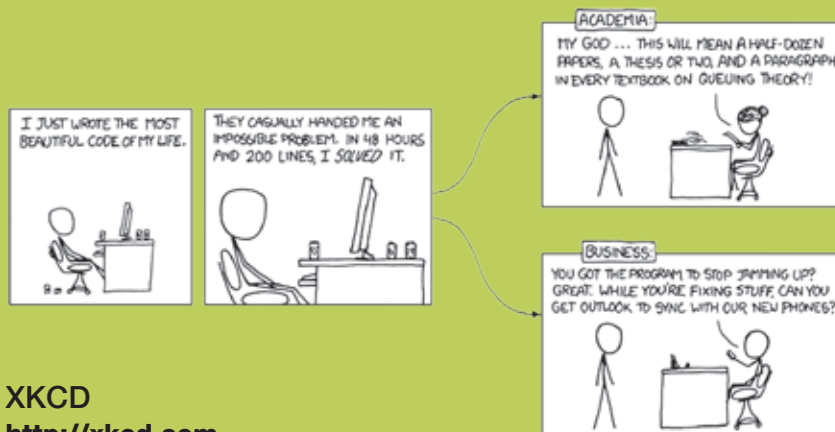
### Lab Bratz Episode #58 - Loot



Lab Bratz written by Ed Dunphy, drawn by Max Velati, www.labbratz.com © 2005-2010, Edward Dunphy. Used with permission.

### Lab Bratz <http://labbratz.com>

This progressive story comic, written by Ed Dunphy and drawn by Max Velati, also centers on the lighter side of academic science as seen through the misadventures of the biology labs of Drs. Chang and Ruby.



### XKCD <http://xkcd.com>

Created by Randall Munroe and known for its minimalist stick-figure art as much as its dry wit, xkcd deals with romance, sarcasm, math and language. (Note: this comic is not for the faint of heart – it occasionally contains adult language and advanced math.)





## Getting the Most Out of the Annual Meeting

BY PETER J. KENNELLY AND JOSEPH PROVOST

**I**t's, well, big!

When recollecting the first time I entered the main exhibit hall at the American Society for Biochemistry and Molecular Biology annual meeting as a graduate student, my mind often wanders to a scenario from a fantasy-adventure film. The heroes, in the midst of exploring some strangely deserted location, suddenly turn the corner or open a door to find a hidden city. There, spread before them, is a teeming mass of people, colorful banners and strange structures filling some vast cave or undersea dome in which the heroes seek refuge. The heroes are pressed for time. They must find within this bewildering maze: a) the leader of this hidden city, b) the rebels battling to bring enlightenment to the people, c) a hidden radio, so they can contact their companions, d) some special element needed to power their crippled spaceship or cure some raging epidemic or e) the location of some critical poster presentation before it is too late!

While we all know that some fortuitous event or remarkable coincidence will take place to guide our fictional heroes to the object of their quest, a novice conference attendee cannot rely on the intervention of a *Deus ex machina*. This article summarizes a few basic practices that will help the first-time participant successfully navigate the acres of conference center, thousands of posters and hundreds of talks that typify each year's gathering of the ASBMB.

### The Venue

For several years, ASBMB has met in concert with other biomedically oriented professional societies at a joint event called "Experimental Biology." The sponsoring societies for Experimental Biology 2010 include the American Association of Anatomists, the American Physiological Society, the American Society for Investigative Pathology, the American Society for Nutrition and the American Society for Pharmacology and Experimental Therapeutics. The attendees are thereby afforded the opportunity to explore the offerings not only of their "home" societies but those of the other participating organizations as well.

The geographic hub of the meeting is the main hall, a

several-acre expanse where row upon row of posters, each marked by a unique alphanumeric identifier, alternate with a colorful kaleidoscope of display booths, where myriad vendors — equipment manufacturers, publishers, supply houses, etc. — vie for the attention of the passing throngs. Every day, a new set of posters is erected, with the presenters assigned an hour or two during the afternoon to stand next to them and answer the questions of the curious onlookers. Scattered throughout the convention center are the many halls and smaller rooms in which plenary talks, award sessions, symposia, and workshops spanning a wide variety of topics will take place. Other functions, such as lunches and various types of social gatherings, occur in the convention center and surrounding hotels.

In the lobby of the convention center are registration booths, a mailbox for leaving notes for other participants and a set of computers for accessing e-mail. Adorning the lobby, corridors and central hall are banners and billboards advertising the participating societies, meeting sponsors and events.

The ASBMB meeting begins with a plenary talk on Saturday evening and proceeds through Wednesday. In addition, a number of special events and small conferences on specialized topics take place on Saturday and Sunday. Among those are the undergraduate poster session, on Saturday afternoon, which is accompanied by workshops targeting the participating students and members of the ASBMB Undergraduate Affiliate's Network, which organizes this event.

### Map Out a Game Plan

Preparation is crucial to getting the most out of the ASBMB meeting. The sheer volume of topics covered at the meeting requires that multiple oral presentations or poster sessions take place concurrently at several locations throughout the building. It is, thus, important that attendees search the program to identify the events that are of greatest interest to them and determine where and when they will take place. The prudent attendee also must examine the floor plans for the convention center to determine how to get from one location to the next.



## Indulge Your Curiosity

The No. 1 priority of most meeting attendees is usually to maximize their attendance at oral presentations and posters covering topics directly related to their work. While this is a natural and understandable objective, to pursue it to the exclusion of all else is to miss a marvelous opportunity to learn about new things and meet new people. Sampling from the broad spectrum of topics covered at the conference offers one the opportunity to put aside the pressures of deadlines and competition for a moment and experience the simple pleasure of satisfying one's curiosity.

Stepping away from the trees to view the forest offers many practical rewards as well. Students can open their imaginations and contemplate their future. *Where do I want to go next? What would I like to work on? With whom would I like to train?* Investigators can step back and view their own science from different perspectives: applying new concepts to the interpretation of their data, imagining new directions for their research, visualizing novel collaborations and previously unsuspected applications for new technologies. You can also learn about the best practices for reaching nontraditional students and mentoring women and undergrads at the ASBMB Minority Affairs Committee symposium on mentoring. These “complimentary skills” certainly will pay dividends as you progress through your career. Taking advantage of the full breadth of the conference is a good way to refresh both your spirit and imagination.

## Research or Education? Do Both!

You also can broaden your experience by attending the education and career sessions and workshops offered by the ASBMB Educational and Professional Development Committee. Learn more about the current pedagogy of the classroom and laboratory and find out the latest about new careers and what employers are looking for. Take the time to prepare yourself for your next teaching assignment or even a new career!

## Pace Yourself

The meeting's four-day span may seem like a short period of time, but it is remarkably easy to feel run-down long before it ends. The conference packs each day well beyond overflowing with presentations, posters, vendors and interesting people. In addition, most attendees spend the evening hours socializing with old and new friends and taking in some of the sites of the host city. Long hours and high energy can take their toll. Build time into your game plan to slow

down. Don't pack your schedule just to appear busy. Here is where budgeting some time to indulge your curiosity and expand your horizons can help. No need to take frantic notes for fear of missing out on something relevant to your own work. You can sit back and simply listen.

Don't run around trying to visit every vendor and collect every “freebie” on the first day. Space out your interactions; use them to provide a change of pace. Be selective, lest you end up dragging around a bulging bag of brochures and giveaways like a ball-and-chain.

## Don't Be Passive!

By far, the most enduring benefit of an ASBMB meeting is a set of newly acquired connections and relationships. The conference provides a unique opportunity to meet scientists from all fields and every corner of the globe. However, meeting new people and establishing new relationships requires active participation. The only real barrier to participation is your own reluctance to act. Your fellow conferees are ready and willing — indeed eager — to answer questions and share their experiences. Like all scientists, they are curious and want to know more about their fellow participants. Even the most distinguished scientist can still vividly recall his or her own experiences as a student.

The meeting provides numerous opportunities for interaction. At the conclusion of every talk, there are a few minutes to answer questions from the audience. Every poster presenter will stand by his or her display at the appointed hour, waiting to discuss his or her work. Posters are a wonderful mechanism for first-time attendees to get involved. In addition, the society has created many interesting opportunities to actively network with your peers: Dance with scientists at the opening reception, run a few miles with your next potential grant reviewer in the 5K Fun Run or talk to Journal of Biological Chemistry editors at a special lunchtime discussion. And, finally, there are few better opportunities to meet people who offer good advice and perhaps affect your career than by attending one of the thematic receptions, the minority scientist reception or the women scientists' networking reception. Those casual interactions can lead to new collaborations and great ideas... all over a plate of snacks and a drink. And, remember: Don't just sit back and eavesdrop — introduce yourself! XXXX

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# Back by Popular Demand: The Annual Meeting Compendia

BY NICK ZAGORSKI

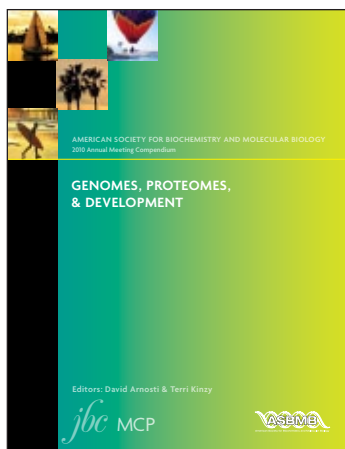
The 2010 American Society for Biochemistry and Molecular Biology annual meeting in Anaheim, Calif., is coming up soon, and, as everyone makes his or her final preparations, ASBMB is offering up a taste of things to come with its 2010 annual meeting compendia.

In keeping with the tradition of these scientific collections, which started with a single compendium on RNA-mediated regulation and noncoding RNA at the 2008 meeting in San Diego, the 2010 compendia highlight recent exciting research in ASBMB journals that relates to the scientific themes covered at the meeting.

This year, ASBMB has compiled seven compendia, each containing 10–15 interesting and informative articles published within the past two years. The articles coincide with select symposia and reflect the research topics that will be discussed in the presentations. The septet offered this year covers a wide range of fields, from traditional biochemical areas like DNA replication, transcription and translation to emerging, technology-driven areas like genomics, quantitative proteomics and drug discovery. The choice of included articles was coordinated with the help of the 2010 annual meeting theme organizers.

This year's compendia also will offer a new element. In addition to showcasing notable Journal of Biological Chemistry papers, such as Papers of the Week, Reports and Faculty of 1000 selections, some compendia will feature high-impact articles from ASBMB's other two journals: the Journal of Lipid Research and Molecular and Cellular Proteomics.

By including all three publications, the 2010 compendia showcase the diverse breadth of research represented by ASBMB members, ASBMB journals and the ASBMB annual meeting.



These meeting compendia offer an excellent primer to the scientific themes at this year's meeting, and we encourage everyone to take a look at them. Hard copies of the compendia will be available at the annual meeting for your reading pleasure, so keep your eyes open.

If you don't get your hands on one, don't worry; the compendia also will be available online for free this month on the JBC Thematic Collections page ([www.jbc.org/site/thematics](http://www.jbc.org/site/thematics)), where they are also available for print on demand. ☺☺☺

Nick Zagorski ([nzagorski@asbmb.org](mailto:nzagorski@asbmb.org)) is a science writer at ASBMB.

## 2010 ASBMB Annual Meeting Compendia and Coordinating Editors

### Protein Synthesis

**Terri Goss Kinzy**,  
protein synthesis, catalysis and turnover theme organizer

### Building Protein Complexes

**Michael Washburn**,  
new frontiers in genomics and quantitative proteomics theme organizer

### Nutrient Sensing & Signaling

**Gerald Hart**,  
metabolism and disease theme organizer

### Drug Discovery & Design

**Adrian Whitty and Peter Tonge**,  
chemical biology and drug discovery theme organizers

### Initiating DNA Replication and Transcription

**Joseph Reese**,  
chromatin and transcription theme organizer

### Genomes, Proteomes, & Development

**David Arnosti**,  
new frontiers in genomics and quantitative proteomics theme organizer

### Lipids: On the Move

**Mary Roberts**,  
lipid interactions in physiology and disease theme organizer

# Social Media at the Annual Meeting

BY NICOLE KRESGE

This year's meeting offers more ways than ever to stay connected and informed. Follow us on Twitter, LinkedIn or Facebook and download our iPhone app, and you'll be able to make the most of your meeting experience.



We're dispatching a team of ASBMB staff "tweeters" at the meeting, and they will be tweeting about sessions, events and changes to the program. Follow us at [twitter.com/asbmb](http://twitter.com/asbmb) or with the hashtag #asbmb2010. You also can get general Experimental Biology meeting information at [twitter.com/expbio](http://twitter.com/expbio) or with hashtag #eb10. And, don't forget to use these hashtags to tweet about the meeting yourself or to upload Twitpics from the meeting.



We will be creating event and discussion threads and notifications that you can follow by becoming a member of the ASBMB group on LinkedIn. Joining the community also is a good way to meet people interested in biochemistry and molecular biology and to view job postings in your field.



If you haven't become a fan of ASBMB on Facebook, you're going to miss out during the meeting. We'll be posting photos and video every day on the ASBMB Facebook fan page. You also can write comments about the meeting on ASBMB's "wall" or use the wall to ask other ASBMB meeting attendees about places to eat and fun things to do in Anaheim. Before the meeting, you can use the Facebook page to set up carpools or find hotel shares.

## Apple iPhone

This year, we also will be unveiling the Experimental Biology iPhone application. Available at the end of March from the App Store on iTunes, the app is free for anyone to download onto his or her iPhone or iPod Touch. With the meeting app installed, users will be able to check meeting times and locations on the fly.

The app will contain information on the programs for all the societies participating in Experimental Biology. Having the app also means that you will be able to retrieve dates, times and locations for presentations, poster sessions and special events from the American Association of Anatomists, The American Physiological Society, the American Society for Biochemistry and Molecular Biology, the American Society for Investigative Pathology, the American Society for Nutrition and the American Society for Pharmacology and Experimental Therapeutics.

In the coming years, we hope to add meeting apps for other smartphones. ☺☺☺



Nicole Kresge ([nkresge@asbmb.org](mailto:nkresge@asbmb.org)) is the editor of ASBMB Today.

### For More Information:

- ASBMB on Twitter: <http://twitter.com/asbmb>
- ASBMB LinkedIn group: <http://bit.ly/b0gVZ9>
- ASBMB meeting LinkedIn event: <http://bit.ly/96NuL0>
- ASBMB Facebook fan page: [www.facebook.com/asbmb](http://www.facebook.com/asbmb)



## ASBMB Inducts Chi Omega Lambda Class of 2010

BY WEIYI ZHAO

**W**ith impeccable academic records and outstanding research, the 2010 class of the American Society for Biochemistry and Molecular Biology honor society, Chi Omega Lambda, is a cohort of promising young scientists with big dreams and big hearts. Even in the midst of their rigorous academic schedules and busy lives, all of these students have found time to serve their local communities. Whether it's doing science outreach in schools, tutoring immigrant families in English or volunteering at summer camp, these students represent a smart generation of socially conscious young people who demonstrate that being great scientists also means being good citizens.

Here, in their own words, are awe-inspiring stories from four inductees who were unanimously elected into Chi Omega Lambda by the ASBMB Undergraduate Affiliate Network Committee.

### **SARAH EDWARDS** *University of Arizona*



I am a junior majoring in biochemistry at the University of Arizona. I came to Tucson from Austin. I chose to major in biochemistry, because I am fascinated by the chemical processes that occur in living cells. After completing my undergraduate degree, I plan to continue my research and studies in graduate school and earn a doctorate in cell

biology. Ultimately, I aspire to conduct research at a university or research institute.

I first began doing research during my summers in high school and have continued my involvement in research at the University of Arizona. Currently, my research in Tsu-Shen Tsao's laboratory focuses on developing a method to measure the redox state of the endoplasmic reticulum in living cells. This past summer, I studied salt stress on cells under the mentorship of

Natalia Dmitrieva and Maurice B. Burg at the National Institutes of Health. I will present the results of my work at the undergraduate poster session at the ASBMB 2010 annual meeting.

In addition to my classes and research, I lead science outreach and education activities in the local community. My goal is to excite kids about science and to give taxpayers (who ultimately support my research) an appreciation of science. I am also involved with the University of Arizona ASBMB UAN chapter, through which I helped to organize an undergraduate research conference for the Southwest region. Outside of science, I love running, cycling and puzzles.

### **VIRZHINIYA LEKOVA** *University of Richmond*



I grew up in Bulgaria and came to the United States when I started college at the University of Richmond. This May, I will be graduating with a Bachelor of Science in biochemistry and molecular biology.

Throughout my undergraduate career, I have been working with glutamate dehydrogenase (GDH) and using it as model to study allostery and protein stability. My first research project focused on the evolution of GDH, working to answer the questions of how and why GDH went from exhibiting no allosteric regulation in prokaryotes to exhibiting complex allosteric regulation in mammals. In my subsequent research project, I studied the effects of various nucleotides on the stability of the enzyme. The highlight of my research experience has been presenting my work at the 2008 and 2009 ASBMB annual meetings. The experience taught me how to effectively communicate my results to others, helped to build my confidence in public speaking and gave me valuable feedback about my work.

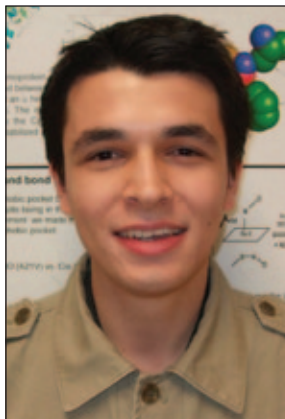


Outside the classroom and lab, my experiences with teaching and my participation in the organization Women in Math and Science have given me a glimpse of what it is like to be a part of the science community. The Women in Math and Science organization on campus provides career guidance to young women. Members regularly meet with distinguished female scientists who talk about the specific challenges that women face in these fields and share their coping strategies. I have worked as a teaching volunteer in a physics summer camp for three-year-olds, as an English-as-a-second-language teacher and as a chemistry teaching assistant. The responsibilities involved in teaching stimulated me to quickly learn how to explain even the most complicated chemistry concepts. But the most important thing I communicated as a teacher, I believe, is a passion for the material. Teaching really has helped me grow as a scientist.

While spending a semester at the University of Edinburgh in Scotland, I took a course in molecular genetics and was fascinated by the way the field incorporates classical genetics, biochemistry and cell biology in the discovery of gene-related processes. I remember reading about eukaryotic chromatin packaging structures one night and thinking they are the most awe-inspiring thing I've ever encountered. I want to explore this microcosm of the gene, and I plan to do molecular genetics research while pursuing a doctorate in molecular biology.

In my free time, I like to read nonfiction and enjoy running. Running not only gives me a break from intellectual activities but also trains the same "mental muscles" one needs to do good research — endurance, perseverance and the ability to focus on a goal. I am excited to be attending the ASBMB annual meeting again this year and presenting a poster with my most recent research.

## **DARIO PASALIC** *University of Arizona*



Much of my childhood was a nomadic experience. Born and raised in Bosnia and Herzegovina until the age of 6, my family and I emigrated to Germany to escape the tensions of war. Four years later, having explored much of Europe, we decided to move to Arizona, a place I could finally call home.

Achieving a higher education has been my dream

since an early age, so attending the University of Arizona was a natural thing to do. Choosing a major was more difficult. I eventually decided on biochemistry and molecular biophysics. At the University of Arizona, my research focuses on muscular dystrophy, a disease that gradually deteriorates skeletal muscle cells, leading to the eventual death of the cells and the surrounding tissue. Specifically, I study the calpain family of proteins, which are calcium-dependent proteases, and, together with the calcium-dependent specific calpain inhibitor, calpastatin, are widely distributed in eukaryotic cells. I have immersed myself in my research by attending scientific conferences, joining professional organizations and participating in clinical research studies. I will be presenting the results of my research at the 2010 American Chemical Society conference.

On campus, I am heavily involved in several student organizations and activities, such as the Peer Mentorship Program, the Student Members of the American Chemi-

### **ASBMB Congratulates the Chi Omega Lambda Class of 2010:**

**Andrew DeVilbiss**  
*University of Wisconsin-La Crosse*

**Daniel Laurent**  
*University of Wisconsin-La Crosse*

**Dario Pasalic**  
*University of Arizona*

**Huidong Yang**  
*State University of New York at Potsdam*

**Jacob Mahoney**  
*University of Wisconsin-La Crosse*

**Jim Ruble**  
*Grand Valley State University*

**Michael Ross**  
*Providence College*

**Sarah Edwards**  
*University of Arizona*

**Sarah Schreiner**  
*University of Wisconsin-La Crosse*

**Travis Wheeler**  
*Eastern Kentucky University*

**Tyler Wuthmann**  
*Wesleyan University*

**Virzhiniya Lekova**  
*University of Richmond*

cal Society-Undergraduate Affiliate Network BioChemistry organization, and, most notably, the first annual Biological, Engineering and Chemical Undergraduate Research Conference for the Southwest region. The latter stands out, because I and several other undergraduates built this conference from the ground up — designing the Web site, recruiting students, raising thousands of dollars and performing myriad other tasks. This was a chance to leave a lasting tradition at the University of Arizona, and it would not have been possible without the support of the Undergraduate Affiliate Network and ASBMB.

Outside of school, I have been volunteering as a hospice companion since 2007, and, in the summer of 2008, I provided aid at a small, rural hospital in Bosnia and Herzegovina. I also have worked with refugee resettlement agencies locally to assist incoming families through English tutoring, finding suitable housing and employment and providing them with general support. The culmination of these experiences over the past four years has led me to realize that, for me, an ideal career must be a combination of medicine, research and community involvement. Having spent the past four years at the University of Arizona, I could not have asked for a better experience.

## HUIDONG YANG

*State University of New York at Potsdam*



I grew up in Suzhou, China, a city known for its classical Chinese gardens, fine silk and green tea. I am currently a senior at the State University of New York at Potsdam, majoring in biochemistry with minors in mathematics and psychology.

My favorite class in college is linear algebra. The class gave me insight into

the beauty and ubiquitous applicability of the eigenvalue model, particularly in spectral graph theory — for example, its application in Google's PageRank algorithm.

The human brain holds a special fascination for me.

# “ Chi Omega Lambda was established to recognize exceptional undergraduate juniors and seniors pursuing a degree in the molecular life sciences ”

I think it is the most complex, elegant and powerful system in the known universe, and I believe that mathematics is one of the most elegant and powerful tools one can use to better understand the brain. My love for both mathematics and the human brain has motivated me to pursue a doctorate in theoretical neuroscience and to eventually become a theoretical

neuroscientist and teacher.

My current research projects investigate the interaction between proteins and metal ions. One project attempts to clone a potential zinc-binding loop of a zinc-transport protein from a cDNA library. The other is the characterization of the kinetic and thermodynamic parameters of iron binding, oxidation and storage of various ferritins, iron transport proteins and iron chelators. I will be presenting the results of my research at this year's ASBMB annual meeting.

When out of the lab, I like to play the recorder, draw and read biographies of scientists as well as Chinese classical literature. I also enjoy track and field. I am particularly interested in the famous physicist Richard Feynman and his books, lectures and jokes. One of my favorite jokes has to do with Ernest Rutherford, who once said, “In science, there is only physics; all the rest is stamp collecting.” Ironically, he won the Nobel Prize in chemistry.

*Chi Omega Lambda was established to recognize exceptional undergraduate juniors and seniors pursuing a degree in the molecular life sciences at a college or university that is a member of the Undergraduate Affiliate Network. For more information about Chi Omega Lambda, visit [www.asbmb.org/honorsociety](http://www.asbmb.org/honorsociety).* ∞∞∞

Weiye Zhao (wzhao@asbmb.org) is the ASBMB manager of education and professional development.

## Poster Presentations

Many of the Chi Omega Lambda inductees will be presenting their research in the 14th Annual Undergraduate Poster Competition at the 2010 ASBMB annual meeting in Anaheim, Calif. Be sure to visit their posters and congratulate them on their outstanding achievements. Special recognition will be given to these students at the meeting.



## The Importance of Hypertension in Disease

BY BENJAMIN S. KO

**E**ven for clinicians and researchers who work with hypertension every day, the scope of the disease is staggering. Hypertension affects some 60 million Americans and more than 1 billion individuals worldwide. The disease ranks as the single-most common reason to visit a doctor's office (1). And, when the relationship between hypertension and other diseases is considered, the full impact of hypertension becomes clear.


According to the World Health Organization, disease attributable to hypertension is the No. 1 cause of mortality in the world (2). Hypertension is a major risk factor for cardiac disease and stroke, with an increase in risk for these ailments with progressively higher blood pressures (3). High blood pressure is the second-leading cause of end-stage renal disease, and its presence increases the rate of progression of all kidney diseases (3). Because of this, hypertension will be a central theme at the American Society for Biochemistry and Molecular Biology meeting in Anaheim, with a session titled, "Hypertension: Treatment, Disparities and Molecular Mechanisms."

Despite the importance of hypertension, our understanding of the disease's pathogenesis remains poor. Given that the various known inherited forms of hypertension have been linked to mutations in kidney-tubule transporters and channels, it is clear that the kidney plays an essential role in blood pressure regulation and the pathogenesis of hypertension. One of the central ion channels for sodium regulation in the kidney is the epithelial sodium channel, which will be discussed by Thomas R. Kleyman in his presentation "Epithelial Sodium Channels and Hypertension" and David Pearce in his talk, "Regulation of Ion Channel Trafficking." Another key transporter is the sodium chloride co-transporter, which Robert Hoover will cover in "Mechanisms of Hormonal Regulation of the Sodium Chloride Co-transporter."

Although a number of agents are now at our disposal for therapies, treatment of hypertension remains inadequate. According to National Health and Nutrition Examination Survey data, only one in three hypertensive Americans has well-controlled blood pressure (3). Well-controlled, in this sense, is defined as a blood pressure reading of less than 140/90 mmHg. While lower blood

pressures correlate with improved mortality, treatment is much more than controlling a number. John Flack will address the issue in his presentation, "Contemporary Approaches to Risk Stratification and Treatment."

Understanding the goals, strategies and targets for hypertension treatment in patients with other co-morbidities is essential for dealing with the disease. Those issues will be addressed by Shawna Nesbitt, Kenneth A. Jamerson and Jackson Wright as they present their talks "Treatment in the Context of Other Diseases," "Avoiding Cardiovascular Complications in People Living with Systolic Hypertension, the ACCOMPLISH trial" and "Combination Therapies to Treat Hypertensive Patients with CKD." And, finally, the larger impact of hypertension in African-Americans will be discussed by Janice Lea in her presentation "Racial Disparities in Hypertensive Cardiovascular Disease and Chronic Kidney Disease."

Hypertension remains a critical public health concern, one that we truly still do not understand. Current research, however, is bringing us closer to that goal, giving us insights into the disease's scope, pathogenesis and treatment. 

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Benjamin S. Ko (bko@medicine.bsd.uchicago.edu) is an assistant professor at the University of Chicago.

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3. Chobanian, A. V., Bakris, G. L., Black, H. R., Cushman, W. C., Green, L. A., Izzo, J. L., Jr., Jones, D. W., Materson, B. J., Oparil, S., Wright, J. T., Jr., and Roccella, E. J. (2003) Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. *Hypertension* **42**, 1206–1252.

### For More Information

To learn more about hypertension, see the Journal of Biological Chemistry minireview series "Biochemistry in Hypertension" at [www.jbc.org/thematics](http://www.jbc.org/thematics).

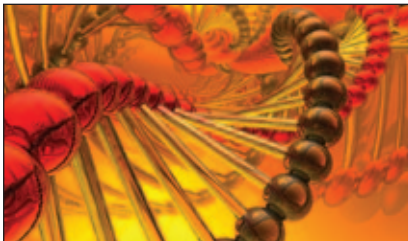
The program for the hypertension session at the annual meeting can be found at <http://bit.ly/bvNGMZ>.



## Special Symposia

**A**lthough its annual meeting provides a great opportunity to experience a wide range of exciting science and meet many people, the American Society for Biochemistry and Molecular Biology understands that sometimes science needs a more intimate setting. For that reason, the society established smaller special symposia programs with specific themes every fall. The special symposia provide an excellent means for researchers in underrepresented or emerging scientific fields to discuss the latest science and network. And, although the symposia can be considered small meetings, there is nothing small about the science; the quality of the meeting organizers, presenters and programming is second to none.

This year, the symposia will explore the biochemistry of membrane traffic, the endosomal sorting complex required for transport (ESCRT) system, the detection and evaluation of post-translational modifications and the role of chromatin and RNA polymerase II in transcriptional regulation. The symposia will be held between Sept. 30 and Oct. 31 in Lake Tahoe, Calif., or Snowbird, Utah. More details on each meeting are presented below. We also will be producing a journal compendium to go with each symposium, so be on the lookout for those in the fall.



## Transcriptional Regulation by Chromatin and RNA Polymerase II

BY ALI SHILATIFARD



Shilatifard

Eukaryotic DNA is several meters long and must be packaged into chromatin in a way that enables the RNA polymerase II machinery to access the genes.

Despite the fact that the process underlies all gene expression, which is fundamental to development and differentiation, we still possess only rudimentary knowledge about genome packaging and how the transcriptional machinery and its regulatory factors interact with the gene-coding sequences.

Eukaryotic RNA polymerase II chromatin plays a pivotal role in regulating gene expression. A central challenge to current research is to determine how RNA polymerase II coordinates the synthesis of messenger RNA, resulting in proper development and cellular regulation. Given the implications of defining the molecular mechanisms of gene expression by chromatin and RNA polymerase II, and its impact on our understanding of cellular development and disease pathogenesis, ASBMB is bringing together investigators from a variety of research areas for a focused meeting on transcriptional regulation.

The meeting will feature keynote speaker Robert E. Kingston of Harvard Medical School, who will discuss his recent findings regarding the molecular machinery required for proper transcriptional silencing by the ATP-dependent remodeling complexes and by complexes in the Polycomb-group of proteins.

The sessions will cover findings in transcriptional initiation, elongation and termination and the role of RNA polymerase II, its C-terminal domain and the associated factors in this process. The roles of chromatin and chromosomes, their interacting proteins and post-translational modifications, their numerous transcriptional properties and their role in development also will be addressed.

Several talks also will be chosen from submitted abstracts. The applications accepted for poster presentations also will compete for two \$1,000 awards.

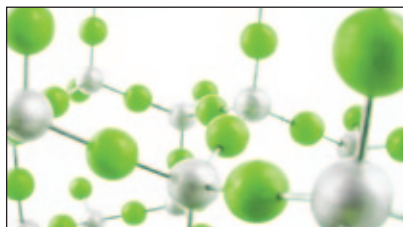
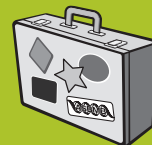
Due to space limitations, we anticipate an oversubscription for this meeting. If that happens, we will make a concerted effort to ensure that each research group wishing to participate is represented. The status of all submitted abstracts will be posted on the ASBMB Web site by mid-September.

See you in Tahoe! XXXX

Ali Shilatifard (ash@stowers.org) is an investigator at the Stowers Institute for Medical Research.

### Transcriptional Regulation by Chromatin and RNA Polymerase II

Sept. 30 – Oct. 4, 2010  
 Granlibakken, Lake Tahoe, Calif.  
 Abstract and registration deadline:  
**Aug. 1, 2010**  
 For more information, visit:  
[www.asbmb.org/TranscriptionalRegulation2010](http://www.asbmb.org/TranscriptionalRegulation2010)



## Biochemistry of Membrane Traffic: Secretory and Endocytic Pathways

BY SUZANNE PFEFFER AND VIVEK MALHOTRA



Pfeffer



Malhotra

Many scientists are carrying out outstanding biochemistry in hopes of defining the precise molecular events that drive the transport of membrane proteins from one compartment to another in eukaryotic cells. This meeting seeks to bring together those interested in understanding how

molecules drive the secretory and endocytic pathways and allow them to share recent breakthroughs and discuss controversies. Unlike most research conferences, the majority of the oral presentations at this meeting will be solicited from submitted abstracts – to ensure that those who are really interested in membrane traffic will have an opportunity to contribute to what we hope will be an excellent program.

For the past 30 years, research has revealed many of the proteins that participate in transport vesicle formation – cargo selection, membrane curving and vesicle coating. But, there remain many pathways for which the transport carriers are

unidentified and for which nothing is known about how proteins are sorted into them. In the endoplasmic reticulum, for example, a nonglycosylated, cytoplasmic viral protein recently was found to be among the most rapidly secreted proteins, suggesting that not all cargos require specific receptors for trafficking. There also is evidence that, in some cases, vesicle docking is linked directly to the vesicle formation process. These observations bring to mind questions like: How is it that vesicles form, containing not only the correct cargos, but also the necessary proteins to drive their docking and fusion? How is vesicle uncoating regulated, and where does it take place?

Many of the proteins that drive membrane traffic are cytosolic factors that are recruited coordinately to different cellular membranes to provide those membrane surfaces with distinct functionalities. We need to define the precise nature of each of these distinct membrane microdomains before we can fully understand how cells are able to sort, secrete and internalize proteins.

Transport vesicles engage molecular motors that rely on either the actin- or microtubule-based cytoskeletons and can move in opposite directions. How do cells regulate these motors to accomplish targeted delivery of transport vesicles? How are target membranes recognized? The structures of tethering factors are beginning to become available, but almost nothing is known about how vesicles recognize and first engage their unique targets. And, despite an enormous body of work on the SNARE proteins that drive membrane fusion, little is known about how active SNARE complexes are formed and how their formation is regulated.

What is the molecular basis for

the biogenesis of the Golgi apparatus, and how are large cargos, such as collagen, transported across and from these membranes? How are regulated-secretory products packaged into transport vesicles that are distinct from those carrying cell-surface receptors? How are receptors that need to be downregulated actually incorporated into the lumens of multivesicular endosomes? How is cargo sorted during the process of autophagy, and how do autophagosomes release exosomes from cells? How do pathogens hijack these processes for their survival and propagation? By defining these events in precise molecular detail, we hope to identify novel and precise targets for future intervention in a number of pathological states.

Thus, we invite all biochemists, molecular cell biologists, structural and systems biologists, proteomicists and biophysicists to join us to learn as much as we can about such an entirely underexplored, fascinating and important research area. Student and postdoctoral fellows especially are encouraged to attend. ☺☺☺

Suzanne Pfeffer (pfeffer@stanford.edu) is a biochemistry professor at the Stanford University School of Medicine, and Vivek Malhotra (vivek.malhotra@crg.es) is at the Center for Genomic Regulation in Barcelona, Spain.

### Biochemistry of Membrane Traffic: Secretory and Endocytic Pathways

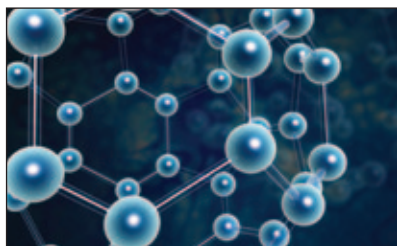
Oct. 28 – 31, 2010

Granlibakken Resort, Lake Tahoe, Calif.

Short talk and poster abstract deadline: **July 1, 2010**

Early registration deadline: **July 30, 2010**

For more information, visit: [www.asbmb.org/MembraneTraffic](http://www.asbmb.org/MembraneTraffic)



## Post-translational Modifications: Detection and Physiological Evaluation

BY KATALIN MEDZIHRAJSZKY AND GERALD W. HART



Medzihradzsky



Hart

With the completion of the human genome and rapid progress in understanding the proteome, it now is clear that the next phase of molecular bioscience largely will, by necessity, focus on post-translational modifications (PTMs) and their regulation of protein functions.

There are more than 400 known PTMs, and, almost without exception, virtually all polypeptides are post-translationally modified. Given the relatively small number of genes and polypeptides in complex organisms, PTMs create the enormous and highly dynamic structural and functional diversity required to regulate essential cellular functions. In recent years, the technologies used to quantitatively study PTMs at the molecular and structural level have developed rapidly, particularly in the area of mass spectrometry. This biannual meeting brings together leading experts in the study of a wide variety of different PTMs to allow cross-fertilization, presentation of the most exciting breakthroughs in the methodology and biological func-

tions of PTMs and lively discussions of new concepts and approaches.

Most of the talks will be selected from abstracts submitted by participants, allowing discussion of the most recent and exciting developments within the field. However, there are several scheduled presentations:

- Tony Hunter of the Salk Institute will present the keynote lecture on the role of protein phosphorylation and other PTMs in the regulation of cell growth and cell division.
- Alma Burlingame of the University of California, San Francisco, will describe his work on the development of state-of-the-art methodologies in mass spectrometry to study O-GlcNAc modifications and the GlcNAc/phosphorylation interplay.
- Brent Martin of the Scripps Research Institute will discuss novel approaches for large-scale analyses of protein palmitoylation in mammalian cells.
- Robert Chalkley of the University of California, San Francisco, will describe innovative developments using database searches for analysis of PTMs.
- Richard D. Cummings of the Emory University School of Medicine will present his pioneering work on the roles of complex protein-bound glycans in cell adhesion, development and microbial or viral pathogenesis.
- Donald F. Hunt of the University of Virginia will discuss his work on the development of new methods and instrumentation for the characterization of post-translational modifications and their application to epigenetics.
- Stuart A. Lipton of the Burnham Institute for Medical Research will present his work on the molecular mechanisms of neurodegenerative diseases and stroke, including his discovery of the roles of protein S-nitrosylation.
- Kevin L. Moore of the Oklahoma

Medical Research Foundation will describe his novel work on the enzymology, biology and functions of tyrosine sulfation.

- Akhilesh Pandey of the Johns Hopkins University School of Medicine will share his findings and views with respect to PTMs and signaling and recent developments in databases for system analyses of PTM biology.
- Tony Pawson of the Samuel Lunenfeld Research Institute will lecture on mechanisms that underlie intracellular signal transduction by modular-protein domains.
- Pierre Thibault of the Université de Montreal will talk about high field asymmetric waveform ion mobility spectrometry (FAIMS) and phosphorylation and about his recent work on protein sumoylation.

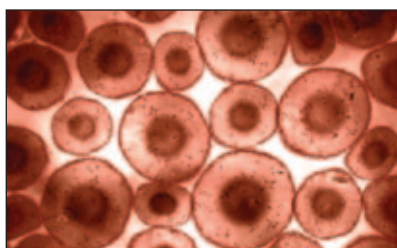
Based on the enormous success of the first meeting held two years ago in Lake Tahoe, this meeting not only will benefit newcomers to the field of PTMs but it also will provide a forum for sharing breakthroughs in both methodology and biology for established investigators. ∞∞∞

Katalin Medzihradzsky (folk@cgl.ucsf.edu) is a professional research chemist at the University of California, San Francisco, and Gerald W. Hart (gwhart@jhmi.edu) is an investigator at Johns Hopkins University.

### Post-translational Modifications: Detection and Physiological Evaluation

Oct. 21 – 24, 2010  
 Granlibakken, Lake Tahoe, Calif.  
 Short talk and poster abstract submission deadline: **Sept. 15, 2010**  
 Early registration deadline: **Aug. 15, 2010**  
 For more information, visit:  
[www.asbmb.org/PostTransMod2010](http://www.asbmb.org/PostTransMod2010)





## Biochemistry and Cell Biology of ESCRTs in Health and Disease

BY JAMES HURLEY AND  
PHYLLIS HANSON



Hurley



Hanson

The endosomal sorting complex required for transport (ESCRT) system is a conserved pathway for membrane budding and scission with roles in endolysosomal sorting and receptor downregulation, autophagy, the egress of enveloped viruses, including HIV-1, and cell division. ESCRT

research has been central to the endosome-to-lysosome sorting field since the discovery of the ESCRTs almost a decade ago. More recently, ESCRT research has become important to other areas: Elucidating ESCRT function is increasingly important in understanding the budding of enveloped viruses, and, defects in the ESCRT pathway have been implicated in neurological diseases. Thus, the short conference on ESCRTs will span ESCRT-ology, from basic biophysical and structural mechanisms, all the way to the clinic.

Despite their expanding numbers, North American ESCRT researchers never have had a dedicated ESCRT conference. Worldwide, there has been only one symposium on the topic, a two-day conference organized by the Biochemical Society and held

in Cambridge, U.K., in 2008. Polling of the field within the United States and Canada made clear that there was a strong desire to sustain the momentum built at that meeting and to involve greater numbers of younger North American researchers. This fall's ASBMB-sponsored meeting will fill this need and will be a must-attend for endolysosomal-trafficking specialists, structural biologists and membrane biophysicists interested in ESCRT mechanism, and cell biologists, virologists and clinical researchers interested in cell division, autophagy, viral budding and neurological diseases.

The meeting will begin with a session on the fundamental mechanisms and structures that underpin ESCRT action and will continue with five sessions on the roles of ESCRTs in various aspects of cell function and disease. The role of ESCRTs in cargo sorting and multivesicular-body biogenesis will be addressed in the first of the five sessions. The session will feature several speakers who pioneered early ESCRT studies and will illustrate how far the field has come and set the stage for the sessions on "newer" roles for ESCRTs. Much of the more recent attention to the ESCRT system has come from the fact that they are required for the detachment of viral buds from the plasma membrane of infected human cells. The session on HIV-1 will feature talks by two of the co-discoverers of this role and will be chaired by another pioneer in the area. The key finding in ESCRT biology in 2007 was the complex's role in severing the narrow membrane neck connecting dividing cells at the last stage of mammalian cytokinesis. The session on development and cell division will feature the leaders in this area and will highlight the roles of ESCRTs in development in plants and other organisms. The junction of receptor endocytosis and endolysosomal sorting has important implications for

signal transduction and cancer, which will be highlighted in the session on receptor downregulation and cancer. The emerging role of ESCRTs in autophagy will be explored in both this session and the subsequent session. The clinical implications of ESCRT dysfunction extend to several classes of disease – but most prominently to neurological diseases. The last session will be, to our knowledge, the first conference session to focus on ESCRTs in neurological disease.

We are very pleased to have Jennifer Lippincott-Schwartz present the keynote lecture. She is one of the world's leading cell biologists and is best known for her work on the Golgi apparatus and for co-developing the photoactivated localization microscopy (PALM) technique for superresolution microscopy. Jennifer's lectures are well known for their high-energy, beautiful images and movies and paradigm-challenging insights.

We appreciate that these are challenging times for funding, and, by keeping the meeting short and centrally located, we hope to keep costs down. For those who are not able to attend the meeting, we will have an archived webcast of the sessions. ∞∞∞

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James Hurley (jh8e@nih.gov) is at the National Institute of Diabetes and Digestive and Kidney Diseases, and Phyllis Hanson (phanson22@wustl.edu) is an associate professor at the Washington University School of Medicine.

### Biochemistry and Cell Biology of ESCRTs in Health and Disease

Oct. 14 – 17, 2010

Snowbird Resort, Snowbird, Utah

Short talk and poster abstract submission deadline: **July 30, 2010**

Early registration deadline:

**July 30, 2010**

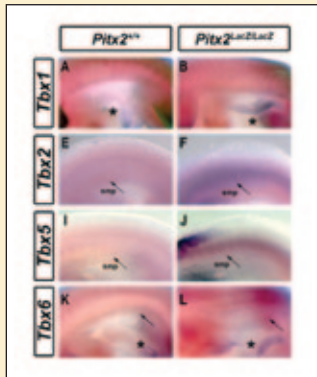
For more information, visit:

**[www.asbmb.org/ESCRTS2010](http://www.asbmb.org/ESCRTS2010)**



## Coordinating T-box Expression

The transcription factor Pitx2 is critical for the development of multiple tissues and organs by promoting proper body-wall formation and closure, although how Pitx2 influences these events is unclear. A likely mechanism might involve the regulation of the T-box family of developmental transcription factors. In this study, the researchers examined abdominal tissue in 10.5-day-old mouse embryos and identified seven T-box genes as targets of Pitx2 at various locations; Tbx4, Tbx15 and Mga were activated by Pitx2 while Tbx1, Tbx2, Tbx5 and Tbx6 were repressed. Chromatin analysis revealed that Pitx2 bound to multiple sites around these genes, both upstream and within introns, along with selected co-repressors or co-activators. Pitx2-dependent occupancy of co-repressors generally resulted in reduced acetylation levels of several T-box genes, whereas Pitx2-dependent occupancy of co-activators showed less consistent



Tbx1, Tbx2, Tbx5 and Tbx6 show upregulated spatial expression in Pitx2-deficient mutant embryos (highlighted by arrows and an asterisk).

chromatin patterns, suggesting they operate in a more site-localized or indirect mechanism. Although Pitx2 is part of a complex gene network, and likely regulates organ development through other signaling pathways, these studies provide the groundwork to better understand abdominal wall defects. \XXX

### Pitx2-dependent Occupancy by Histone Deacetylases Is Associated with T-box Gene Regulation in Mammalian Abdominal Tissue

Traci Hilton, Michael K. Gross and Chrissa Kioussi

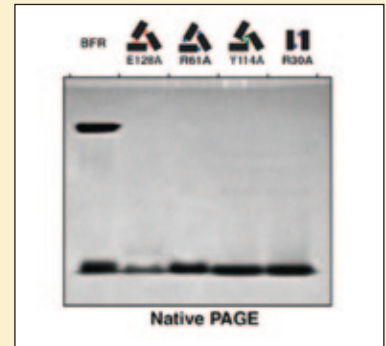
*J. Biol. Chem.*, published online Feb. 3, 2010

*jbc*

## A Very Close Alanine Shave

Many proteins self-assemble into larger, multisubunit complexes held together by protein-protein interactions. Although the interfaces between subunits are often quite large, the binding energies usually are localized to a few “hot-spot” residues, thus providing key pharmaceutical targets. In this study, the researchers used *Escherichia coli* bacterioferritin (BFR), a cage protein composed of 24 subunits, as a model to identify key amino acid residues that control self-assembly and protein stability. They first identified

nine potential hot-spot residues by inspecting the BFR crystal structure and then designed, expressed and purified alanine mutants at these sites for a shaving mutagenesis study. Four



Native PAGE shows that bacterioferritin mutants R30A, R61A, Y114A and E128A exhibit no detectable 24-mers.

residues — Arg-30, Arg-61, Tyr-114 and Glu-128 — shut down formation of the 24-mer complex when mutated and led to the formation of a cooperatively folded dimer. This suggests that these residues are crucial “switch residues” that promote higher-order assembly. These findings provide an excellent starting point for future work analyzing how structure relates to function in supramolecular proteins as well as for the design of drugs to disrupt protein self-assembly and novel protein nanostructures. \XXX

### Alanine Shaving Mutagenesis to Determine Key Interfacial Residues Governing the Assembly of a Nanocage Maxiferritin

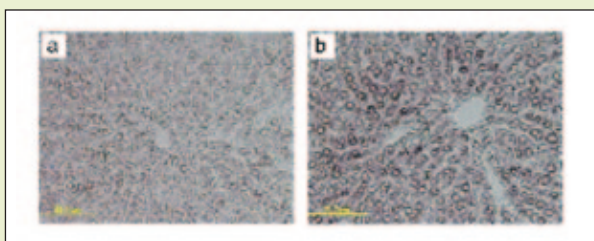
Yu Zhang, Siti Raudah Mohamed Lazim, Huihian Teo, Gwenda W. S. Teo, Rongli Fan, Xiaoming Sun and Brendan P. Omer

*J. Biol. Chem.*, published online Feb. 5, 2010

*jbc*

## Retinoids and CYPs

Cytochrome P450s (CYPs) are known for their important roles in metabolizing both xenobiotic drugs and endogenous compounds. Several members of this family are believed to metabolize vitamin A and its derivative, retinoic acid (RA). In this study, the authors characterized CYP2C22 from rat, a member of the CYP2C family that shares homology to human CYP2C8 and CYP2C9. They found that CYP2C22



CYP2C22 mRNA transcripts barely are detectable in the liver of vitamin A-deficient rats (left) but, upon treatment with vitamin A, increased dramatically (right).

was expressed almost exclusively in hepatocytes, where it was quite abundant. CYP2C22 mRNA was upregulated by all-*trans*-RA and the nonmetabolizable *at*-RA analog am580, whereas in human hepatocytes, *at*-RA increased the expression of CYP2C9 but not CYP2C8. Analysis of the CYP2C22-promoter region revealed an RA-response element in the distal-flanking region; this region could bind to the nuclear hormone receptors RAR and RXR and was required for transcriptional activation in response to RA treatment. In metabolic assays, 9-*cis*-RA was revealed to be an especially strong competitor for *at*-RA, though 9-*cis*-RA was not converted to other metabolites by the enzyme, suggesting it functions as an inhibitor but apparently not as a competitive substrate. Together, this work provides additional insight into the role of the CYP2C family in retinoid metabolism. XXXX

### Liver-specific Cytochrome P450 CYP2C22 Is a Direct Target of Retinoic Acid and a Retinoic Acid-metabolizing Enzyme in Rat Liver

Linxi Qian, Reza Zolfaghari and A. Catharine Ross

*J. Lipid Res.*, published online Feb. 10, 2010



## Sequencing Imperfection

Database search algorithms are the primary means of identifying mass spectra data. However, these methods are limited to spectra whose peptides are present in the database, preventing the identification of peptides from mutated or alternatively spliced sequences. For example, antibodies confound standard identification techniques, because they are products of somatic hypermutations and large-scale genome rearrangements. A variety of search methods has been developed to allow for sequence variations, but even those tools still require a homologous peptide as a template. Another approach is *de novo* identification of peptide sequences, which does not require a protein database, but may have lower accuracy. In this study, the authors present a novel approach, called GenoMS, that draws on the strengths of both methods. Protein-sequence templates first are identified using a database search tool, and the templates are then used to recruit, align and sequence the regions of the target protein that are either missing or divergent from the database. The authors used the approach to reconstruct the full protein sequence for the antibody raised against the B- and T-cell lymphocyte attenuator molecule (aBTLA) using both protein and genomic templates; in each instance, the sequence was more than 97 percent accurate. XXXX



Reconstruction of the aBTLA heavy and light chains from protein-template databases with GenoMS.

### Template Proteogenomics: Sequencing Whole Proteins Using an Imperfect Database

Natalie E. Castellana, Victoria Pham, David Amott, Jennie R. Lill and Vineet Bafna

*Mol. Cell Proteomics*, published online Feb. 17, 2010



## Functional Résumé Writing Tips for Life Scientists

BY CLIFFORD S. MINTZ

**L**ike it or not, writing a carefully constructed résumé or curriculum vitae is a vital part of any successful job search. Inexperienced job seekers hastily tend to craft résumés without paying much attention to format, style or content and then wonder why they can't land interviews. The best way to approach résumé writing is to think of a résumé as a work of art — something that requires a lot of thought, creativity and attention to detail. As one well-known professional recruiter and job-search expert put it, "Trying to find a job without a smart, well-crafted résumé is like showing up for dinner at a fancy restaurant in a T-shirt and cutoffs. They won't let you in."

It is important to think of a résumé as a personal marketing brochure that will either help land face-to-face interviews or turn a job search into a long and frustrating process.

The primary goal of a résumé is to show prospective employers how you are different from other applicants and why you should be considered a viable candidate. While I can't guarantee that following these tips will result in a job interview, they will help you to craft a job-worthy CV.

### Writing Tips

Hiring managers, professional recruiters and human-resource professionals quickly tend to scan résumés and make snap judgments about the viability of appli-

cants. Therefore, an applicant's qualifications, skills and personal attributes must jump off of the paper to catch a reader's attention. This can be accomplished easily by using bold type, headings, underlining, bullets and varied font sizes. Avoid using paragraphs, because they are dense and difficult to navigate. However, overuse of visual callout techniques also can overwhelm readers, so be judicious about their placement and frequency of use.

Powerful, action-oriented, emotional words produce strong, positive impressions. Unfortunately, we scientists have been trained to write in passive voice. That being said, try to resist using passive voice, and sell yourself as much as possible!

### Objective or Summary Statement

I am sure that somebody has told you at one time or another to include an "objective" or "goal" on your résumé. Objectives and goals tend to be boring, vague and passive. Instead, I recommend that you craft a vibrant, action-oriented, can-do "summary of qualifications" section that reflects and highlights why you are a right-fit candidate.

### Professional Experience

Résumés and CVs can be constructed either chronologically or functionally. Chronological résumés, which are most common, list content in temporal order and should be used for either lateral job moves

or when looking for a new job to advance your career. When crafting a chronological résumé, list work experience from the most recent to past. In contrast, functional résumés offer content based on skills and are most effective for individuals seeking career changes. Functional résumés should present your skills in the order of importance for the new career you are pursuing.

It is important to include only information relevant to the position to which you are applying. Unrelated job titles or skills sometimes can confuse hiring managers and, in some instances, cause them to pass on qualified candidates. As mentioned above, most hiring managers are simply too busy to read all of the CVs that receive. Résumés that are chosen for further consideration typically are the ones that contain pertinent, job-specific information presented in a straightforward manner.

If you have switched jobs frequently or have gaps in your experience, put the dates of employment in the far right-hand column of the résumé, or hide the job changing by combining or grouping jobs. Also, employment dates should be listed as years and not exact start and stop dates.

### Tailoring Your Résumé

A résumé is not just a list of what you have done and where you have been. It is an opportunity to present and highlight your skills and how those skills translate into making you



the right candidate. Quantifying or playing up achievements and using strong, definitive statements elevate and authenticate you.

For each position you apply for, it is important to list all experience (in the order of perceived importance) relevant to the hiring manager. Carefully reviewing job descriptions will allow you to quickly and easily identify those things that are most important. What is seen first usually means the most!

When necessary, résumés should be tailored so that your skill sets and accomplishments match what was stated in the job description. This means it is highly unlikely that you will be able to use the same résumé/CV for all the jobs in which you are interested. To insure success, I highly recommend you take the time to tailor each résumé/CV that you submit.

## Odds and Ends

Many people say résumés should be no longer than one or two pages. While this may be the convention for many fields, it is certainly not applicable to CVs or scientific résumés. However, it is a good idea to limit the length of your CV/résumé, because, outside of academic circles, nobody has the time nor the inclination to read a CV that is half an inch thick! When I was working as a professional recruiter, it typically took me a minute or less after scanning a résumé/CV to determine whether I had identified a right-fit candidate. Candidates whose CVs are too long, verbose or difficult to decipher rarely make it to the interview stage. I subscribe to the notion that less is more and simple is elegant!

When listing your educational background, I recommend present-

ing your lowest degree first and ending with your most advanced degree or educational experience. The name and location of the institution that awarded the degree and your major or area of expertise also should be listed. It is reasonable to list the names of your graduate or postdoctoral advisers if you think it will help your candidacy.

You also may want to include your thesis title if you wrote a master's or doctoral thesis. It is not necessary to list the dates your degrees were awarded — by listing dates, an employer may be able to deduce your age. While this may not be a bad thing for entry-level employees, it may hinder more experienced job seekers from securing new positions.

Membership in professional societies, organizations or clubs should be listed in a section that is separate from your educational background. Invited lectures or presentations also may be listed under a separate heading. It is important to list extracurricular activities or specialized skill sets you think may be relevant.

All of your publications should be listed on the last page of your CV in a section titled “publications.” This section should be divided into subsections and appear in the following order: 1) peer-reviewed publications; 2) chapters, books and reviews and 3) oral and poster presentations. However, if you are a mid-career professional, I strongly recommend that you list only peer-reviewed publications, review articles, books and book chapters and eschew the oral and poster presentations sections. Manuscripts that are in press should be listed. That being said, I don't think it is appropriate to include submitted manuscripts — this signals

you may not think your publication list is long enough to warrant consideration.

Never send your references to prospective employers unless they ask for them. Simply indicate somewhere on your résumé/CV that references are available upon request. However, for most academic jobs, it is customary for search committees to request references at the beginning of the application process. For industrial jobs, references generally are not requested unless an employer is interested in a candidate.

Finally, it is important to understand that a well thought-out and carefully crafted résumé/CV is a necessary first step in the job hunt. Poorly organized CVs that contain spelling and grammatical errors are certain to eliminate you as a candidate. With this in mind, before you send out your résumé or CV, make sure that it has been spell-checked and reviewed by a friend or colleague. In today's economy and highly competitive life sciences job market, small mistakes may lead to or perpetuate unemployment! ☹☹☹

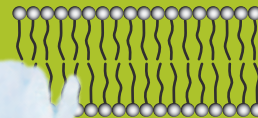
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Clifford S. Mintz (cliff@biocrowd.com) is a freelance writer, blogger and speaker at career fairs and professional meetings.

## Meet the author

Clifford S. Mintz will be at the ASBMB annual meeting, working as part of the FASEB careers team, giving talks and doing résumé critiques. For more information, go to <http://bit.ly/cX1zlp>.





# What Can Plant Models Teach Us About Lipid Trafficking?

BY CHRISTOPH BENNING

Plants are important to most life forms on Earth, because they produce the oxygen in the atmosphere, fix carbon dioxide and provide reduced carbon to sustain heterotrophic organisms, including humans. Plants are even the source of fossil and renewable fuels that power our cars, all courtesy of photosynthesis. To accomplish this feat, plant cells harbor chloroplasts, which have one of the most extensive membrane systems found in nature, the photosynthetic membrane. What may surprise people is that these membranes contain mostly nonphosphorous galactoglycerolipids, because sessile plants need to conserve phosphorus (1). Given that plant, algal and photosynthetic bacterial biomass is greater than that of heterotrophic organisms, these galactoglycerolipids are more prevalent in the global biosphere than phospholipids.

To make the lipids of the photosynthetic membrane, there is a division of labor between the endoplasmic reticulum and the chloroplast, requiring the exchange of lipid precursors across multiple membranes (2). *Arabidopsis*, which had its genome published 10 years ago (3), has promised to be a model for the discovery of components of the underlying transport machinery. Already, mutants of *Arabidopsis* have led to the identification of an ATP-binding cassette transporter hypothesized to carry phosphatidic acid (2), because one of the subunits specifically binds this phospholipid (4). This protein contains a mammalian cell-entry domain present in mycobacterial cell surface proteins. Most Gram-negative bacteria also have orthologs of the transporter, which, in *Escherichia coli*, was recently proposed to be involved in maintaining the asymmetry of the outer cell membrane (5).

Is this an isolated example for discoveries in *Arabidopsis* that can advance our general understanding of fundamental cell biological processes? Hardly so, as recently pointed out by Alan Jones and his colleagues (6). A noticeable example is the *ago1* mutant of *Arabidopsis*, isolated by my former graduate student Karen Bohmert. She discovered the founding member of the ARGONAUTE family (7) now known to be involved in gene-silencing pathways guided by small RNAs.

The protein was named by our collaborators, Michel Caboche and his co-workers, after a cephalopod inspired by the *Arabidopsis ago1* mutant phenotype. For those interested in learning more about the promise of *Arabidopsis* as a model, a special issue of The Plant Journal entitled “*Arabidopsis*: A Rich Harvest 10 Years after Completion of the Genome Sequence” was published March 2010 (Vol. 61, issue 6). Articles in the issue are freely available for downloading at [www.theplantjournal.com](http://www.theplantjournal.com) and are accompanied by a podcast on the Web site with testimonials from scientists that illustrate why *Arabidopsis* has emerged as a model equal to *E. coli*, yeast, *Drosophila* or *Caenorhabditis*.

Mechanisms of nonvesicular transfer of lipids between membranes of different organelles are poorly understood in any organism, yet they are essential to the development, maintenance and health of all eukaryotic cells. Any eukaryotic model that promises new insights is welcome, including the little weed that has already proven it could. XXXX

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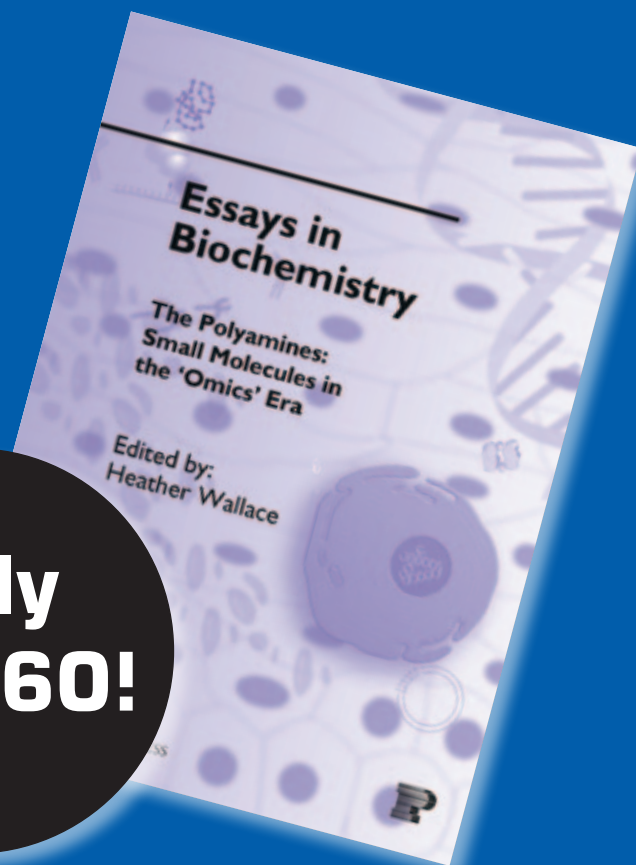
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978-1-85578-175-7 – Paperback – October 2009

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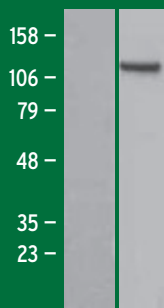
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