ASP NEWS

Winter 2011 vol. 40(1)

Message from the President

My very best wishes to ASP members and their families for 2011, the end of the first decade of the 21st century. I am honored, excited, and humbled to take up the Presidency of the ASP. As you know, at the last annual meeting in June of 2010 (Providence, RI), the membership voted to change the term of the president from one to two years, supporting a proposal that was under discussion for many years. The hope is that this extension of term provides a more reasonable period for envisioning and implementation of new programs for change.

Currently, researchers in science and medicine have emphasized the importance of multi-disciplinary studies. Many funding agencies are calling for applications from multiple principal investigators to bring together diverse expertise. In this respect, photobiology is unique in that it is inherently a mix of numerous disciplines bound together simply by the love of the photon. So we should celebrate the vision of those who founded our society and sustained it in the initial years.

However, as we move forward, we face several serious challenges. The major one in my view is membership: there has been a significant attrition over the years and there is an insufficient number of younger members. The reasons for attrition are complex and the pain of decreasing membership is being felt by many scientific societies. For the ASP, some of it may come from the spawning of independent groups that were traditionally within the ASP umbrella. This speaks to the success of our society. On the other hand, these groups represented an important component of photobiology and there are efforts under way to establish healthy collaborative relationships with such groups and other societies in order to capture the best that related professional societies offer. The regional topical meetings that have already begun under **David Sliney** are part of this effort.

We live in a global society and any outreach efforts will include international groups when possible. The Executive Committee will be discussing ways to enhance such collaborations in the coming meetings and we would very much like to hear your ideas to help make the ASP the vibrant society that it deserves to be. You can do so by a simple email to **Linda Hardwick (lhardwick@allenpress.com)**, to any council members, or to me.

IN THIS ISSUE

But that is not enough. I request that the membership participate actively in the process of building the ASP for the 21st century. As a start, I ask, and challenge each one of you to bring in one new member to the ASP in the next 6 months. In particular, I am asking the younger members of the society to get more involved. As one step in this direction, I am encouraging the appointment of committee membership so that at least one member is a junior scientist, and in some cases even a co-chair. I anticipate that numerous committees will have members or co-chairs with young scientists. We hope that these budding scientists will view this as a privilege and a responsibility. And of course, it will enhance their CVs! In addition, Australian, Asian, and European liaisons could help provide a broader society base. We are also working on improving the ASP web site, and you will soon be hearing from **Tom Vogelmann** about this. Your suggestions are most welcome!

ASP-2012: June 23-27, 2012, Montreal

Finally, I am excited about the upcoming 36th ASP meeting, to be held in Montreal (June 23-27, 2012). We will soon be posting more information on this topic. The year 2012 is is also the 40th anniversary of the founding of the ASP and should be additional reason to celebrate. The enthusiasm of ASP members regarding this meeting has been outstanding and gratifying. **David Mitchell**, our previous president, and I will be co-chairing this meeting. We have already received many suggestions and I encourage you keep these coming. Send any ideas you have to David (**dmitchel@mdanderson.org**) or to me (**thasan@partners.org**). This meeting will be around the time of the famous Montreal jazz festival (**www.montrealjazzfest.com**), and thanks to Linda Hardwick, we were able to negotiate excellent hotel rates.

We hope that you will be able to join us to make this meeting successful, and that you will use this meeting to introduce new colleagues to our society. We look forward to seeing you at what promises to be a scientifically and socially vibrant meeting.

-Tayyaba Hasan

Letter from the Editor

I hope that 2010 has been good to you all and that 2011 will be even better!

The cover article of this newsletter features an article by ASP President **Tayyaba Hasan**. Tayyaba describes her plans to tackle one of the biggest challenges of the ASP -- declining membership. In case your own membership is about to lapse, we have enclosed a membership form on the last page of this newsletter. Why not print out a few copies and pass them around to friends and colleagues?

On page 3, **David Kessel** again regales us with one of his tales from the archives, this time from our San Francisco meeting in the year 2000. His tale involves a bottle of California wine, a red laser, a crystal ball, and a psychic. Given David's keen powers of observation, you better keep out of trouble at our upcoming meeting in Montreal (June 23-27, 2012), or you too may end up in one of his tales.

Montreal, site of ASP-2012

Finally, if you're like me, you may have over-indulged and put on a few pounds over the holidays. An article on page 4 describes a recent study which says that exposure to dim light at night-time may lead to weight gain, at least if you're a male mouse. Hence my New Year's resolution: only eat cookies during the daytime.

ASP News

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Tale from the Archives

Centerpiece of the Hyatt Lobby

In the year 2000, the 28th ASP meeting was in San Francisco at the Hyatt Regency Embarcadero Center, an architecturally fascinating locale. Then, as now, the lobby was filled with gawkers admiring the decor. The ASP meeting was not trouble-free: a deficit of just over $130,000 was reported. The gavel had also vanished, so a "surrogate gavel" was produced: a bottle of California wine. Outgoing President **Chuck Gomer** presented this to incoming President **Woody Hastings** during the Business Meeting. The deficit was presented to **Dan Yarosh**, the Treasurer.

The nearby psychic reader and the infamous crystal ball (above)

Among the items on display by vendors was a monster solid-state red laser that resembled a magic wand made of chromium. As we were examining this device, I noted a small gathering in a room across the street from the Hyatt around a crystal ball. A glance downward revealed that this was the location of a "Psychic Reader".

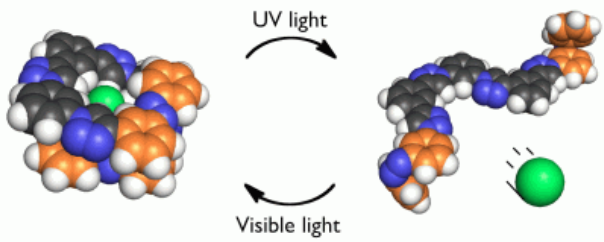
It was decided that we should point the laser at the crystal ball. The results exceeded expectations. The ball lit up like a Christmas ornament, and the crowd promptly scattered in horror. Some people ran from the building and headed in the general direction of the bay. One fellow, with a bit more insight into modern technology, began peering intently at our room in the Hyatt, but we all took care to get out of sight. This may have been good for the psychic's business, because the next day, people were lining up to get in. So much for the argument that photobiology isn't good for business.

-David Kessel

Light switch Cl^- binder

Chemists at Indiana University Bloomington have designed a molecule that binds chloride ions, but can be conveniently compelled to release the ions in the presence of ultraviolet light.

Reporting in the *Journal of the American Chemical Society*, IU Bloomington chemist **Amar Flood** and PhD student **Yuran Hua** explain how they designed the molecule, how it works and, just as importantly, how they know it works.



When azobenzene units (blue) at the ends of the receptor are struck with UV light, the receptor unfolds the helix and releases the chloride ion (green). Image by Amar Flood

"One of the things we like most about this system is that the mechanism is predictable -- and it functions in the way we propose," said Flood, who led the project.

Chloride is a relatively common element on Earth, ubiquitous in seawater and in the bodies of living organisms.

"We have two main goals with this research," Flood said. "The first is to design an effective and flexible system for the removal of toxic, negatively charged ions from the environment or industrial waste. The second goal is to develop scientific and even medical applications. If a molecule similar to ours could be made water-soluble and non-toxic, it could, say, benefit people with cystic fibrosis, who have a problem with

chloride ions accumulating outside of certain cells."

Many organic molecules exist that can bind positively charged ions, or cations, and this has much to do with the fact that it is easy to synthesize organic molecules with negatively charged parts. Synthesizing organic molecules that bind negatively charged ions like chloride presents special challenges.

Hua Y, Flood AH (2010) Flipping the switch on chloride concentrations with a light-active foldamer. *J Am Chem Soc* 132: 12838-40.

The binding molecule or "foldamer" Flood and Hua designed is both a folding molecule and a small polymer, meaning the foldamer's constituent parts can be synthesized with relative ease. Under visible light of 436 nm, the foldamer prefers a tight spiral structure that allows specially configured residues to interact with each other, which improves stability, and creates an attractive pocket for chloride. In the presence of ultraviolet radiation (365 nm), the foldamer absorbs energy and the tight spiral is destabilized, weakening the chloride binding pocket and freeing chloride to re-enter the solution.

The "light switch" properties of the foldamer could make it an invaluable tool to biochemists and molecular biologists who seek to adjust the availability of chloride in their experiments by simply turning on or off a UV radiation source.

The foldamer is not quite ready for that, however. It can only be dissolved at present in organic solutions, whereas living systems operate mostly in water-based solutions.

"That's the direction we're headed," Flood said. "It actually wouldn't be that difficult to modify the molecule so that it is water soluble. But first we need to make sure it does all the things we want it to do."

In their *JACS* paper, Flood said he and Hua wanted to bring synthetic chemistry together with modern diagnostic approaches to demonstrate the efficacy of their foldamer.

"A lot of the ideas in our paper have been floating around for some time," Flood said. "The idea of a foldamer that binds anions, the idea of a foldamer that you can isomerize with light, the idea of receptor that can bind anions ... But none of the prior work uses conductivity to show that the chloride concentrations actually go up and down as intended. What's new is that we've put all these things together. We think we have something here that allows us to raise our heads to the great research that's preceded us."

Flood and Hua used an electrical conductivity test to show that when voltage is applied to the solution containing chloride ions and the binding molecule, electricity flows more freely in the presence of UV light, when the binder is relaxed and chloride is disassociated from it. That was proof, Flood said, that the foldamer was working as intended.

"My training is in building molecular machines," Flood said. "I create machines that do what we want them to do -- and to show what's possible in chemical and biological laboratory science."

The binding molecule Flood and Hua describe is an improvement on a previous binder developed by Flood and then-postdoctoral fellow **Yongjun Li** that was also an oligomer of sorts but did not fold. This previous iteration of the chloride binder was closed and donut-shaped, using space restrictions and strategically placed atoms to yield a binding pocket with a special affinity for chloride.

-David Bricker

(reprinted with permission: *IU News Room*)

Light at night and obesity

Persistent exposure to light at night may lead to weight gain, even without changing physical activity or eating more food, according to new research in mice.

Researchers found that mice exposed to a relatively dim light at night over eight weeks had a body mass gain that was about 50 percent more than other mice that lived in a standard light-dark cycle.

“Although there were no differences in activity levels or daily consumption of food, the mice that lived with light at night were getting fatter than the others,” said **Laura Fonken**, lead author of

the study and a doctoral student in neuroscience at Ohio State University. The study was published in the *Proceedings of the National Academy of Sciences.*

If the mice are not less active or eating more, what's causing the bigger weight gain? Results suggest that mice living with light at night eat at times they normally wouldn't.

In one study, mice exposed to light at night – but that had food availability restricted to normal eating times – gained no more weight than did mice in a normal light-dark cycle.

Randy Nelson, professor of neuroscience and psychology at Ohio State University

"Something about light at night was making the mice in our study want to eat at the wrong times to properly metabolize their food," said **Randy Nelson**, co-author of the study and professor of neuroscience and psychology at Ohio State.

If these results are confirmed in humans, it would suggest that late-night eating might be a particular risk factor for obesity, Nelson said.

In one study, mice were housed in one of three conditions: 24 hours of constant light, a standard light-dark cycle (16 hours of light at 150 lux, 8 hours of dark), or 16 hours of daylight and 8 hours of dim light (about 5 lux of light).

The researchers measured how much food the mice ate each day. They also measured how much they moved around their cages each day through an infrared beam-crossing system. Body mass was calculated each week.

Results showed that, compared to mice in the standard light-dark cycle, those in dim light at night showed significantly higher increases in body mass, beginning in the first week of the study and continuing throughout.

By the end of the experiment, light-at-night mice had gained about 12 grams of body mass, compared to 8 grams for those in the standard light-dark cycle. Mice in constant bright light also gained more than those in the standard light-dark cycle, but Nelson said the dim light-at-night mice were better comparisons to the light exposure that humans generally get.

The dim light-at-night mice also showed higher levels of epididymal fat, and impaired glucose tolerance, a marker of pre-duiabetes.

Although the dim light-at-night mice didn't eat more than others, they did change when they ate, results showed. These mice are nocturnal, so they would normally eat substantially more food at night. However, the dim light-at-night mice ate 55 percent of their food during the daylight hours, compared to only 36 percent in the mice living in a standard light-dark cycle.

Since the timing of eating seemed significant, the researchers did a second study, similar to the first, with one important difference: instead of having food freely available at all times, food availability was restricted to either the times when mice would normally be active or when they would normally be at rest.

Fonken, LK *et al.* (2010) Light at night increases body mass by shifting the time of food intake. *Proc Natl Acad Sci* 107: 18664-9.

In this experiment, mice exposed to the dim light at night did not have a greater gain in body mass than did the others when their food was restricted to times when they normally would be active.

"When we restricted their food intake to times when they would normally eat, we didn't see the weight gain," Fonken said. "This further adds to the evidence that the timing of eating is critical to weight gain."

The findings showed that levels of cortocosterone, a stress hormone, were not significantly different in dim light-at-night mice compared to those living in a standard light-dark cycle.

That's important because corticosterone has been linked to changes in metabolism, Fonken said. This shows there doesn't have to be changes in corticosterone levels to have changes in metabolism in the mice.

So how does light at night lead to changes in metabolism? The researchers believe the light

could disrupt levels of the hormone melatonin. In addition, it may disrupt the expression of clock genes, which help control when animals feed and when they are active.

Overall, the findings suggest another possible reason for the obesity epidemic in Western countries."Light at night is an environmental factor that may be contributing to the obesity epidemic in ways that people don't expect," Nelson said. "Societal obesity is correlated with a number of factors including the extent of light exposure at night."

For example, researchers have identified prolonged computer use and television viewing as obesity risk factors, but have focused on how they are associated with a lack of physical activity.

"It may be that people who use the computer and watch the TV a lot at night may be eating at the wrong times, disrupting their metabolism," Nelson said. "Clearly, maintaining body weight requires keeping caloric intake low and physical activity high, but this environmental factor may explain why some people who maintain good energy balance still gain weight."

Other co-authors were **Joanna Workman**, **James Walton**, **Zachary Weil**, and **John Morris**, all of Ohio State; and **Abraham Haim**, of the University of Haifa (Israel).

-Jeff Grabmeier

(reprinted with permission: *OSU Research News*)

ELAFOT-2010

10th Latin-American Photochemistry Conference, La Serena, Chile

La Serena, Chile

This Conference was scheduled for April 2010, but due to the devastating February earthquake and tsunami, the conference was rescheduled for October 10-14. The Chilean colleagues (especially **Elsa Abuin** and **Antonio Zanocco**) should be strongly congratulated, because they managed to put together an excellent program and to reschedule the meeting for October in the same place as originally planned.

There were 182 participants (some, but not all, in the picture below), 85 of whom were students.

The participants were mainly from Chile, Brazil, and Argentina, but there were also attendees from Colombia, Russia, and Germany. Due to the rescheduling, there were very few "gringoes". Prominent among them were **Ana Moore**, **Gonzalo Cosa**, **Susana Sánchez**, and myself. It is always a great pleasure for Latin-Americans working abroad to go back to our homelands to witness the enthusiasm and engagement of young people in our home countries, and to establish working ties with research groups.

The plenary lectures by Ana Moore (Arizona State Univ.), **René Nome** (Univ. São Carlos and UNICAMP), Susana Sánchez (Univ. California, Irvine), **Pedro Aramendía** (Univ. Buenos Aires), **Teresa Atvars** (UNICAMP), **Gonzalo Cosa** (Univ. Montreal), **Andrés Thomas** (INIFTA, La Plata), and **Silvia Braslavsky** (Max-Planck-Inst. for Bioinorg. Chem., Mülheim an der Ruhr) covered a variety of subjects, including mimicking natural photosynthesis for solar energy use, single-molecule spectroscopy, photo-polymerization, calculations and complexes spectroscopies, photo-sensitization, and solvent influence in photoreactions.

The invited lectures were mostly given by very engaged younger researchers. The discussions were very lively, as were the sessions. In addition, there were 160 posters wonderfully presented in two afternoon sessions.

There was a session dedicated to **Carlos Previtali**, leader of the photochemistry group at the University of Rio Cuarto (Argentina) and teacher of several generations of photochemists. Another session was dedicated to **Eduardo Silva** (Universidad Católica de Chile) who established an internationally recognized research group on flavins and their photoexcited chemistry.

The venue was excellent and we could only

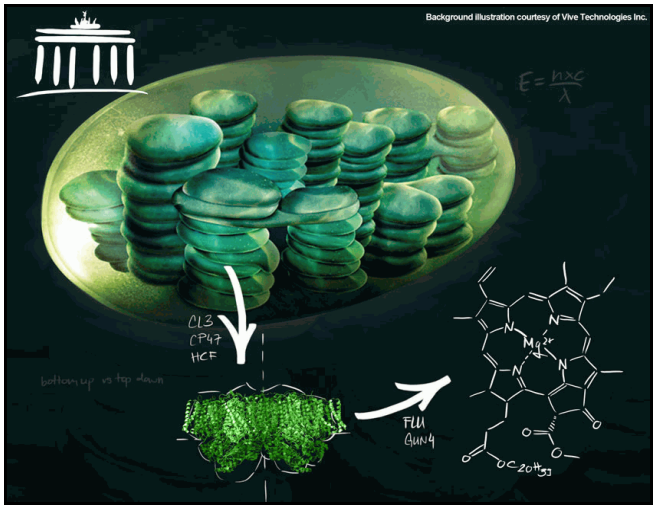
complain about the weather, which was rather cold (bad luck!). The Conference excursion was to the very picturesque Elqui Valley, including a visit to a Pisco-making cellar and the corresponding vineyards, and to the town where **Gabriela Mistral** (1945 Chilean winner of the Nobel Prize in Literature) was born. We all shared the happiness of the Chilean colleagues for the rescue of the 33 miners, which happened during the Conference. We also shared the Thursday after-dinner dancing which was very lively, common in these conferences.

The next ELAFOT will most probably be in Argentina in 2012, and we hope to meet again earlier, during the Inter-American Photochemistry meeting to be held in Mendoza, Argentina in May of 2011.

-Silvia E. Braslavsky

ICTPPO 2011

International Conference on Tetrapyrrole Photoreceptors of Photosynthetic Organisms



The organizing committee of the International Conference on Tetrapyrrole Photoreceptors of Photosynthetic Organisms (ICTPPO) is pleased to invite you to our upcoming meeting in Berlin, from July 24-28, 2011.

Many of you are aware of these biennial conferences, and many have attended previous meetings, the last of which was in Asilomar, CA (USA), under the leadership of **Clark Lagarias** from University of California, Davis.

In 2011, the conference will take place at the "Harnack-House" of the Max-Planck-Society in Berlin, Germany, which offers a familiar and inspiring atmosphere. As with our previous meetings, we are expecting colleagues from Asia, the Americas, Australia, and Europe.

We have made efforts to recruit outstanding scientists who can provide plenary lectures on their state-of-the-art research. We would be grateful if you would share your most recent research results in the field of tetrapyrrole photoreceptors, as an oral presentation or a poster.

We have already been successful in inviting the following colleagues as keynote speakers or chairs: **D. Bryant**, **J. Casal**, **L.O. Essen**, **P. Fromme**, **Y. Fujita**, **R. v. Grondelle**, **S. Hörtensteiner**, **J. Hughes**, **M. Ikeuchi/R. Narikawa**, **D. Jahn**, **B. Kräutler**, **C. Lagarias**, **W. Lubitz**, **M.A. Mroginski**, **R. Tanaka**.

Berlin is an attractive and lively city, with many social and cultural activities, many highly esteemed museums, and other cultural events. For more details and information on registration and accommodations, please see the homepage of the conference.

ICTPPO-2011: July 24-28, 2011
Berlin, Germany
ewww.mpi-muelheim.mpg.de/ictppo2011

This homepage provides you with nearly all the information required to attend. We have taken care to offer accommodations and registration fees at reasonable levels, as we are expecting and are encouraging, many young scientists to attend.

There are hotels within walking distance, but the "Harnack-House" itself offers about 60 guest rooms that can be booked at convenient rates (provided on a first-come basis). We have blocked these guest rooms for the time period of the meeting. Please use the drop-down menus from the web-page for further details.

If you need further information, please contact any member of the organizing committee. This offer extends also for your request for a formal letter of invitation so you can apply at your national funding agency.

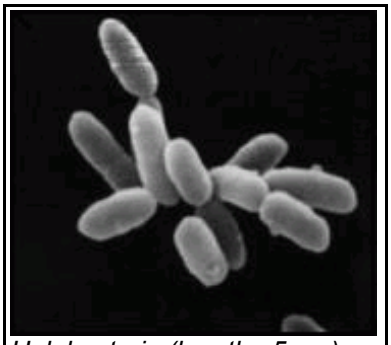
We are very much looking forward to hearing of

your interest in ICTPPO 2011, and welcome you to Berlin in July 2011.

-Wolfgang Gärtner, **Bernhard Grimm**, **Nicole Frankenberg-Dinkel**, **Alfred R. Holzwarth** (ICTPPO-2011 Organizing Committee)

Research by ASP Members

Potential for write-once recording with bacteriorhodopsin



Halobacteria (length ~5 µm) grow in high-salt environments. Their membranes contain abundant bacteriorhodopsin.

Bacteriorhodopsin is a purple integral membrane protein that is abundant in *Halobacterium salinarum* and other halobacteria. This protein absorbs light energy and uses this energy to transport protons out of the cell. The resulting pH gradient is then converted to chemical energy that the cell uses for diverse biochemical and physiological functions.

Dyukova TV, Druzhko AB (2010) Peculiar properties of photoinduced hydroxylaminolysis in different bacteriorhodopsin-based media using O-substituted hydroxylamines. *Photochem Photobiol* 86: 1255-58.

In the November/December issue of *Photochemistry and Photobiology*, Tatyana V. Dyukova and Anna B. Druzhko (Institute of Theoretical and Experimental Biophysics, Russian Academy of Sciences) report their study of photoinduced hydroxylaminolysis of bacteriorhodopsin-based media by use of different O-substituted hydroxylamines. Their comparison of wild type and D96N bacteriorhodopsin indicated that the D96N form was more effectively bleached than the wild type form, and that gels modified with O-(4-nitrobenzyl) hydroxylamine hydrochloride (NBHA) and O-(2,3,4,5,6-pentafluorobenzyl) hydroxylamine hydrochloride (FBHA) were more photosensitive.

They conclude that their results have important implications for the design of an irreversible-recording medium. In particular, a gel with D96N bacteriorhodopsin that is modified with FBHA may be a promising medium for optical processing.

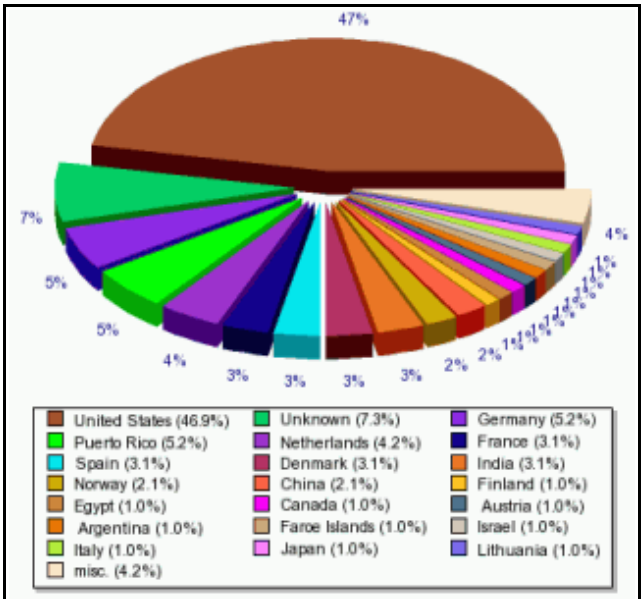
-PAE (modified from ASP web site)

ASP Homepage Usage Stats

Visitation Summary

Dates: Sept 21, 2010 to Jan 4 2011 (105 days)
Total page views: 2602
Average page views per day: 24.7

Most recent 100 visitors to the ASP homepage (as of Jan 4, 2011, 1:40PM EST). Green indicates most recent 10 visitors, white indicates most recent 100 visitors, and red indicates webmaster.



Locations of visitors to the ASP homepage (Sept 21, 2010 to Jan 4, 2011)

Photobiology Events

Interactive Map/Table:
www.pol-us.net/meetings.html
(All submissions to: ensmingr@twcny.rr.com)

Jan 16-21, 2011
Renewable Energy: Solar Fuels (GRC)
Ventura CA (USA)
Web site: www.grc.org

Jan 22-27, 2011
SPIE Photonics West
San Francisco CA (USA)
Web site: spie.org/x2584.xml

May 10-14, 2011
13th IPA World Congress: International Photodynamic Association
Innsbruck (Austria)
Web site: www.ipa2011.at

May 15-20, 2011
Spin Chemistry Meeting 2011
Noordwijk (Netherlands)
Web site: scm2011.leidenuniv.nl

May 17-20, 2011
21st Inter-American Photochemical Society Conference
Mendoza (Argentina)
Web site: www.inifta.unlp.edu.ar/iaps21/index.html

May 22-26, 2011
SPIE/OSA European Conference on Biomedical Optics
Munich (Germany)
Web site: spie.org/x6140.xml

May 29-June 3, 2011
CO2 Assimilation in Plants: Genome to Biome (GRC)
Les Diablerets (Switzerland)
Web site: www.grc.org

Jun 9-11, 2011
6th International Laser Therapy Conference
Toronto (Canada)
Web site: www.internationallaser.org/index_new.html

Jun 11-17, 2011
Photosynthesis, Bioenergy and the Environment (GRC)
Davidson NC (USA)
Web site: www.grc.org

Jun 26-Jul 1, 2011
Frontiers in Optical Bio-imaging and Microscopy
ICMAT2011
Suntec, Marina Centre (Singapore)
Web site: www.mrs.org.sg/icmat2011/s27.htm

Jul 9-15, 2011
Photochemistry (GRC)
Easton MA (USA)
Web site: www.grc.org

Jul 24-28, 2011
ICTPPO-2011
Berlin (Germany)
Web site: ewww.mpi-muelheim.mpg.de/ictppo2011

Aug 6-10, 2011
Plant Biology 2011
Minneapolis MN (USA)
Web site: my.aspb.org/?page=Meetings_Annual

Aug 7-11, 2011
25th International Conference on Photochemistry
Beijing (China)
Web site:
www.conferencenet.org/conference/ICP2011.htm

Aug 28-Sep 1, 2011
14th International Congress of Radiation Research
Warsaw (Poland)
Web site: www.icrr2011.org/main/article/ptbr

Sep 2-7, 2011
ESP Congress
Geneva (Switzerland)
Web site: www.esp-photobiology.it

June 23-27, 2012
ASP-2012: 36th ASP Meeting
Montreal (Canada)
Web site: www.asp2012.org

Aug 20-24, 2012
Plant Biology 2012
Austin TX (USA)
Web site: my.aspb.org/events/event_list.asp

Oct 21-26, 2012
IPMB-2012: 10th International Congress on Plant Molecular Biology
Jeju City, Korea
Web site: www.ipmb2012.org/main.html

Other Event Calendars:

SPIE Events:	spie.org/x1375.xml
Plant Biology Events:	aspb.org/calendar
Chemistry Events:	www.chemistry.org
Gordon Res Confs:	www.grc.org
Cell:	www.cell.com/conferences

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__ $40/yr Emeritus (printed version and online access to *Photochem Photobiol*)
__ $0/yr Emeritus (online access to *Photochem Photobiol*)

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