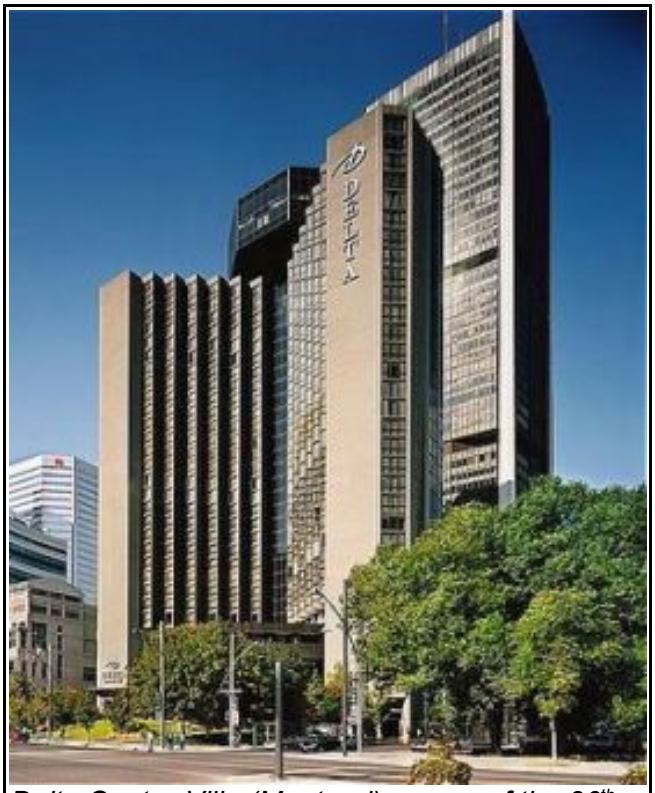
ASP NEWS

Autumn 2010 vol. 39(4)

ASP 2012 in Montreal

June 23-27, 2012

The 36th Meeting of the American Society for Photobiology will be at the Delta Center-Ville, Montreal (QC) from June 23-27. Our conference will be in the middle of beautiful downtown Montreal. **David Mitchell** and **Tayyaba Hasan** are the organizers. More information, as it becomes available, will be posted at **www.asp2012.org**.



Delta Center-Ville (Montreal), venue of the 36th Meeting of the ASP on June 23-27, 2012.

There is always something to do in Montreal. Event calendars for your upcoming trip to ASP-2012 are available:

www.montrealkiosk.com/montreal-events

www.go-montreal.com/attraction_events.htm

IN THIS ISSUE

ASP New Investigator and Research Awards for 2010

Inadvertently, the winners of the 2010 ASP Research Award and New Investigator Award were not given in the previous newsletter issue. Please think about award nominees for the upcoming ASP meeting in Montreal.

George Brainard (left) of Thomas Jefferson University, 2010 ASP Research Award winner.

Jolon Dyer (left), of the Lincoln Research Centre (NZ), 2010 ASP New Investigator award winner

New Bioluminescent Fungi

The genus *Mycena* is a large group of widely distributed small mushrooms. **Dennis Desjardin** et al. (*Mycologia* 2010, 102: 459-477) recently reported seven new bioluminescent species of this genus, including *Mycena chlorophos* (above).The top photo was taken in daylight and the bottom photo in darkness. Images courtesy of Dennis Desjardin.

Letter from the Editor

The venue and dates for the 36th Meeting of the ASP (ASP-2012) have now been set: June 23-27, 2012 at the Delta Center-Ville hotel in downtown Montreal. As more information becomes available, it will be posted at the meeting web site: **www.asp2012.org**.

Beginning on page 3, **Don Forbes** (ASP Secretary) provides a detailed explanation of the changes in our Constitution and Bylaws that were adopted at the recent ASP Business meeting in Providence, RI. These changes were made necessary by our change from annual scientific meetings to biennial scientific meetings that alternate with biennial topical symposia. The previous rules would have created an unequal burden for ASP Presidents in terms of planning for the scientific meetings.

This issue of the newsletter also features an article on the effect of low levels of anti-depressants on shrimp. **Yasmin Guller** and **Alex T. Ford** (University of Portsmouth, UK) recently reported that fluoxetine (Prozac) significantly altered phototaxis and geotaxis in the shrimp, *Echinogammarus marinus*. This could be a significant ecological problem, given that large amounts of anti-depressants and other drugs are regularly discharged into wastewater.

Once again, **David Kessel**, Councilor and ASP Historian, describes some memorable events from our 1985 meeting in New Orleans and the 1986 meeting in Universal City. One marvels that there was time for any science among all the booze, Mongolian haircuts, and tattoos.

ASP News

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Editor

Peter A. Ensminger
256 Greenwood Place
Syracuse, NY 13210
Tel: 315-478-6024
E-mail: ensmingr@twcny.rr.com

Updates to Constitution/Bylaws

ASP Constitution and Bylaws Amended at Society's 35th Business Meeting

When the ASP adopted the revised (biennial) schedule for its scientific and business meetings,the terms of office for members of its Executive Committee were left unchanged. This resulted in a very uneven distribution of effort among those elected to the office of President, since only alternating presidents would preside over scientific meetings. In addition to that issue, the Constitution and Bylaws Committee was asked to deal with certain unintended limitations and consequences of ASP's nomination and electoral processes.

The committee offered four modifications (two in the Constitution and two related ones in the Bylaws) to be recommended for acceptance by vote of the ASP membership. The modifications were approved by Executive Committee and by Council, and presented as two motions for vote by members. At the subsequent business meeting in Providence, projected time line graphs were used to contrast the old and new temporal relationships between terms of office and the Society's scientific meetings. These graphs are given on page 10 of the newsletter.

The **FIRST MOTION** relates to making changes in the Constitution and Bylaws. The parts of the affected documents are as follows:

(Constitution)
ARTICLE VII (BYLAWS)
The provisions of the Constitution of the Society shall be carried out in accordance with the Current Bylaws of the Society.
ARTICLE VIII (AMENDMENTS)
Amendments may be initiated by individual Members of the Council or by a petition to the Council signed by ten Members of the Society. Amendments must be approved by a two-thirds majority of the Council, must then be discussed at a subsequent business meeting of the Society and must finally be ratified in a mail ballot by two-thirds of those Members of the Society voting.

(Bylaws)
ARTICLE IX (AMENDMENTS)
Amendments to the Bylaws shall be initiated according to the same procedures as amendments to the Constitution, except that a majority vote at the business meeting shall suffice for ratification.

Recommended changes:

Amendment 1 (Constitution)
The wording of Article VIII notwithstanding, the section on amendments shall read: "Amendments may be initiated by individual Members of the Council or by a petition to the Council signed by ten Members of the Society. Amendments must be approved by a two-thirds majority of the Council, and must finally be ratified in a ballot by two-thirds of those Members of the Society voting. Voting may be done by paper ballot (postal service or currier), or electronically (such as fax, email or ASP website). Approved amendments must be presented at the next business meeting of the Society."

Amendment 1 (Bylaws)
The wording of Article IX notwithstanding, the section on amendments shall read: "Amendments to the Bylaws shall be subject to the same procedures as amendments to the Constitution."

This **FIRST MOTION** was made, seconded, and passed without dissent.

The **SECOND MOTION** was to amend the Constitution and Bylaws with respect to elections and terms of office. The existing documents read as follows:

(Constitution)
ARTICLE IV (OFFICERS)
The officers of the Society shall be the President, President-Elect, the Immediate Past-President, the Secretary, and the Treasurer. The President-Elect shall serve a term of one year followed by one year as President and one year as Immediate Past-President. Presidents are

limited to a single term. The Secretary serves a three-year term and may be re-elected for one additional term. The Treasurer is appointed from the membership by the Council for a three-year term and serves at the pleasure of the Council, and may be reappointed for additional terms.

(Bylaws)
ARTICLE VIII (ELECTIONS)
Nominations for offices to become vacant shall be made by the nominating committee. Nominations may be made by ten Members in the form of signed petition or letters. In addition, a written statement by the nominee of willingness to serve must be received. In order that the names of persons so nominated may appear on the ballot, petitions or letters must be received by the chair of the nominating committee (the Past-President) before the Fall Council meeting. The final list of nominees arranged as a ballot, and containing more that one name for each vacancy to be filled, shall be mailed to the Members. The candidate for each office receiving the highest number of votes will be elected.
The election of Councilors shall follow the same schedule as for the election of officers.
The slate of the nominating committee shall contain at least one more name than the number of vacancies for both full and unexpired terms. Additional nominations for Councilor may be made by five members in the form of signed petition or letters. In addition, a written statement by the nominee of willingness to serve must be received.
All Officers and Councilors shall take office at the end of the business meeting. On years in which the scientific meeting and associated business meeting are not held, terms of office shall begin on 1 July.

The proposed changes were as follows:

Amendment 2 (Constitution)
The forgoing notwithstanding, the whole of article IV shall be replaced by the following:

"**ARTICLE IV (OFFICERS)**
The officers of the Society shall be the President, President-Elect, the Immediate Past-President, the Secretary, and the Treasurer. The President-Elect shall serve a term of two years followed by two years as President and two years as Immediate Past-President. Presidents are limited to a single term. The Secretary serves a four-year term and may be re-elected for one additional term. The Treasurer is appointed from the membership by the Council for a four-year term and serves at the pleasure of the Council, and may be reappointed for additional terms. The modified terms of office shall begin with the officer installation at the end of the Society's 2010 scientific and general business meeting."

Amendment 2 (Bylaws)
The forgoing notwithstanding, the whole of Article VIII shall be replaced by the following:
"**ARTICLE VIII (ELECTIONS)**
Nominations for offices to become vacant shall be made by the nominating committee. Additional nominations may be made by ten Members in the form of signed petition or letters. In addition, a written statement by the nominee of willingness to serve must be received. In order that the names of persons so nominated may appear on the ballot, petitions or letters must be received by the chair of the nominating committee (the Past-President) before the Fall Council meeting. The final list of nominees arranged as a ballot, and containing at least one name for each vacancy to be filled, shall be mailed to the Members. The candidate for each office receiving the highest number of votes will be elected. If there is not a clear winner for any given office (for example, in the case of a tie between the top two vote recipients), a run-off election will be held at the earliest available date.
The election of Councilors shall follow the same schedule as for the election of officers. The slate of the nominating committee shall contain at least one name for each vacancy for both full and unexpired terms. Additional

nominations for Councilor may be made by five members in the form of signed petition or letters. In addition, a written statement by the nominee of willingness to serve must be received.

All elected Officers and Councilors shall take office at the end of the business meeting."

The **SECOND MOTION** was made, seconded, and passed without dissent. The changes took effect immediately.

The adjusted timelines for meetings and terms of office are provided on page 10 of the newsletter.

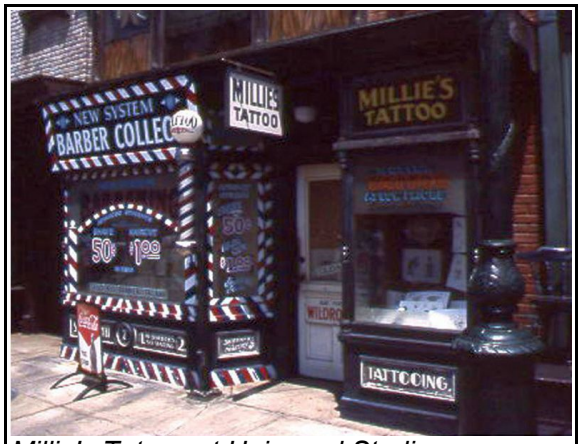
- Don Forbes (ASP Secretary)

Tales from the Archive

The 1985 ASP meeting in New Orleans was greeted by a heat-wave comparable to what had occurred during the 1981 conference in Williamsburg. The second Council meeting was held in a room whose air-conditioning was more suitable for a warm day in Fairbanks. While the outside windows and doors to the hotel corridor were left open, only a gentle 90ºF breeze blew through the room.

The table was littered with bottles ...

Half-way through the meeting, a collection of hotel operatives arrived bearing a large collection of liquor bottles left over from the President's reception the night before. The table rapidly became littered with these and ASP members passing by the meeting room received the distinct impression that the Council consisted mainly of alcoholics. After hearing several derisive comments from the hallway, **President Walt Shropshire** decided that those doors needed to be closed, even at the risk of heat-stroke. When the meeting broke up, each Council member left with an armload of bottles, resulting in even more derisive commentary.



Millie's Tatoos at Universal Studios

The next year, ASP met at Universal City CA, home of the Universal Studio. A major attraction was **Millie's Tattoo Parlor**, next to an old-time barber shop. I understand that many members left with souvenirs of their visit in the form of small tattoos. Nobody will admit to this, but if you look carefully at the photograph above, you might be able to make out a somewhat familiar past-President getting 'decorated'. Those cheap haircuts also attracted a few photobiologists until it was revealed that the service was being provided by a Mongolian barber with only an electric clipper.

- David Kessel (ASP Historian)

Note from the Editor: The tattooed President (you know who you are!) may be interested to know that *Photochem Photobiol* has published several recent articles on the use of UV radiation for tattoo removal.

Antidepressants make shrimps see the light

Rising levels of antidepressants in coastal waters could change sea-life behaviour and potentially damage the food-chain, according to a new study.

Research into the behaviour of shrimps exposed to the antidepressant fluoxetine, showed that their behaviour is dramatically affected. The shrimps are five times more likely to swim toward the light instead of away from it – making them more likely to be eaten by fish or birds, which could have devastating effects on the shrimp population.

"Crustaceans are crucial to the food chain and if shrimps' natural behaviour is being changed

because of antidepressant levels in the sea this could seriously upset the natural balance of the ecosystem," said Dr **Alex Ford** from the University of Portsmouth's Institute of Marine Science.

Yasmin Guler, Alex T. Ford. Anti-depressants make amphipods see the light. *Aquatic Toxicology*, 2010; 99: 397-404.

"Much of what humans consume you can detect in the water in some concentration. We're a nation of coffee drinkers and there is a huge amount of caffeine found in waste water, for example. It's no surprise that what we get from the pharmacy will also be contaminating the country's waterways."

The research is published in the journal *Aquatic Toxicology*. The study found that the shrimps' behaviour changes when they are exposed to the same levels of fluoxetine found in the waste water that flows to rivers and estuaries as a result of the drugs humans excrete in sewage.

Dr Ford's research was motivated by a species of parasite which can alter the behaviour of aquatic creatures through changing serotonin levels within the brains of the organisms. Serotonin is a neuro-hormone found in many animals, including humans, known to control types of behaviour, such as modulating mood and decreasing anxiety.

Drugs to combat depression in humans are often designed to target levels of serotonin which led to the question of whether they could also alter the behaviour of marine organisms.

Dr Ford said: "Effluent is concentrated in river estuaries and coastal areas, which is where shrimps and other marine life live – this means that the shrimps are taking on the excreted drugs of whole towns."

Prescriptions for antidepressants have risen rapidly in recent years, according to the Office for National Statistics. In 2002, there were 26.3 million antidepressant prescriptions handed out by doctors in England and Wales - yet the environmental effect of pharmaceuticals in sewage has been largely unexplored.

Dr Ford is hoping to carry out future research on a number of other prescribed drugs on the market known to affect serotonin.

Head of the School of Biological Sciences, Professor **Matt Guille**, said: "Dr Ford has conducted some beautifully simple research, which potentially shows huge ecological consequences. I hope it will lead the way for further study of prescribed drugs and other substances impacting on the country's marine-life."

- Reprinted with permission from the University of Portsmouth © 2009

Smart Skin in Cephalopods

Colorful, changeable animal skin provides "bio-inspiration" for materials of the future

Roger Hanlon (left) and Lydia Mäthger study cephalopod chromotophores. Cephalopods are the acknowledged masters of camouflage,but they also produce dozens of skin patterns for communication.

Colors and patterns surround us every day: in our homes, cars, clothes, buildings, entertainment devices, and, of course, in the natural world. We mostly take this for granted, but look around you for just five minutes—regardless of where you are—and you will notice a staggering array of designs with multiple colors, contrasts, contours, and textures.

Humans are visual, inventive creatures who have engineered many of these colorful devices with increasingly diverse technology and materials. There is keen interest in creating changeable colors and patterns for many applications, such as in palmtop computers, or PDAs. Yet there are substantial energy costs involved. Your palmtop's

screen, for example, may have dazzling graphics, but it requires a continual energy source to emit white light, color, and pattern; even then, bright light (such as sun) will overwhelm it. Thus, engineers and materials scientists are looking to nature for inspiration on how to manipulate light in more energy-efficient, yet still visually rich ways.

Nowhere in the animal kingdom is changeable color and pattern better developed than in the cephalopods—the squid, octopus, and cuttlefish.

Recent Articles by Mäthger & Hanlon:

>> Mäthger LM, Denton EJ, Marshall NJ, Hanlon RT (2009) Mechanisms and behavioural functions of structural coloration in cephalopods. *J R Soc Interface* 6: S149-63.

>> Hanlon RT, Chiao CC, Mäthger LM, Barbosa A, Buresch KC, Chubb C (2009) Cephalopod dynamic camouflage: bridging the continuum between background matching and disruptive coloration. *Philos Trans R Soc Lond B Biol Sci* 364: 429-37.

The marvelous animals live in competitive marine environments and have evolved a completely unique skin system that instantaneously changes its appearance. They are the acknowledged masters of camouflage, but they also produce dozens of skin patterns for communication with one another. How do they do this, and what are the photonic structures in the skin that enable such optical diversity? The first of these questions is the theme of much of our research. The short answer is that the cephalopods use visual information—they have sophisticated eyes—to control their body patterns mainly by direct neural control of pigmented organs (chromatophores) in their skin.

But answering the second question —what are these biophotonic skin structures?—can lead us toward some potentially novel ways to manipulate light within man-made products.

One theme that is emerging from our research on animals with changeable skin patterns (cephalopods, fish, chameleons, etc.) is this: All of the animals seem to combine pigment cells in the skin with structures that reflect light. This "simple" idea has seldom been implemented in man-made systems. In our laboratory, we have been studying the gross and fine structure of the cephalopod skin, and measuring the light that is absorbed or reflected by the skin's various pigments, reflectors, and diffusers.

To our surprise, we have found that there are only three pigments in the cephalopod skin: yellow, red, and brown (or sometimes black). So where do the blues, greens, and other colors in their glorious skin patterns come from? Blue, green, pink, red, yellow, or silver is produced when incoming light reflects off other cells, called iridophores, at a particular angle. Iridophores are changeable; they can be turned on and off by a chemical signal from the animal, and then tuned to different colors. Remarkably, the reflecting material in iridophores is a translucent protein called reflectin. Other researchers have manufactured reflectin and placed it on man-made thin films; the proteins self-organized and reflected light!

Yet for these beautiful skin colors to be visible, the animal skin needs a base layer of white to provide contrast. And how does the cephalopod skin do this? In cuttlefish and octopus, specialized cells called leucophores produce white in the bottom layer of the skin. These cells are very efficient: they "collect" all the available wavelengths in the ambient light field, collate them, and then diffuse the resultant light field in every direction equally well, and with high reflectivity. No other photonic structure yet described in nature can do this with similar efficiency. Moreover, they do so without using muscles or nerves; i.e., they do it passively and without direct energy.

This is a wonderful, biological example of "passive display technology," which is a burgeoning industry with widespread appeal and applicability throughout society. Presently, titanium dioxides are used for bright-white reflectivity in many passive-display products, but they are physically abrasive, which may impact industrial production processes. In contrast, leucophores are soft, flexible proteins that produce comparable white-light diffusion, and may inspire new materials construction.

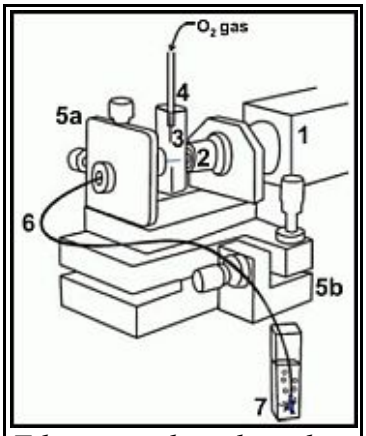
"Bio-inspiration" has worked its way into many

areas of life, from electronics to nanotechnology. In the textile industry, for example, fabrics have been designed that are based on the principles of spider silk, proteins, and plant fibers. By exploring and understanding one of nature's most impressive displays of biophotonics—the cephalopod skin—we may also create products with a rainbow of changeable patterns and colors.

- Roger Hanlon and Lydia Mäthger (copyright Marine Biological Laboratory, Reprinted from *MBL Catalyst* with permission from the Marine Biological Laboratory.)

Research by ASP Members

I. Fiber-optic $^1O_2$ Generator



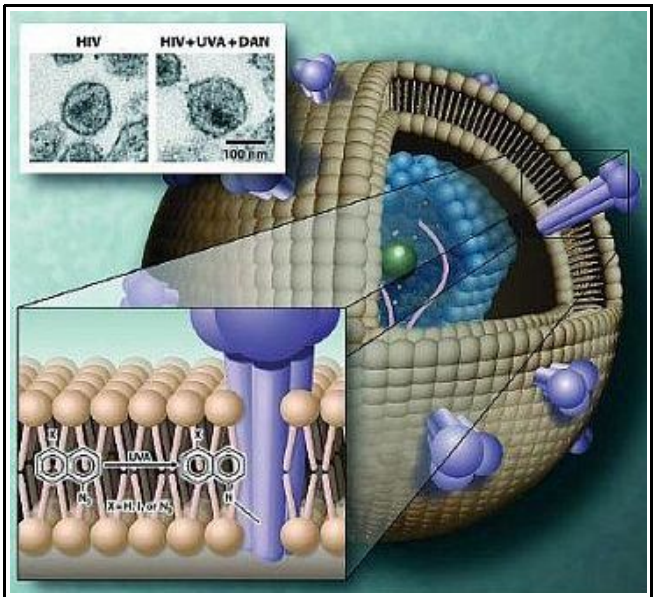
Fiber-optic-based singlet oxygen generator (from Photochem Photobiol *86: 890-4).*

Singlet oxygen is a highly reactive form of oxygen that has applications in photodynamic therapy, disinfection, chemical synthesis, and other fields. Recent research by **Zamadar**, **Aebisher**, and **Greer** (*J Phys Chem B* 113: 15803-06; 2009) has shown that a hollow-core fiber-optic singlet oxygen generating device can deliver singlet oxygen to discrete locations in aqueous solutions (see figure above).

In a recent issue of ***Photochemistry and Photobiology***, researchers from the same laboratory describe the effect of their fiber-optic singlet oxygen generator on killing of *E. coli*. Their results indicate that this novel device, when used with N-benzoyl-DL-methionine as a chemical trap, generated 20 fM singlet oxygen near the probe tip and effectively killed *E. coli* in solution. Moreover, the probe tip can be reused following baking and reloading with sensitizer. These results have important implications for the design and development of future water purification devices.

Aebisher D, Zamadar M, Mahendran A, Ghosh G, McEntee C, Greer A (2010) Fiber-optic singlet oxygen [$^1O_2$ ($^1\Delta_g$)] generator device serving as a point selective sterilizer. *Photochem Photobiol* 86: 890-4.

II. Using UV to Create Vaccines



Various aryl-azido compounds used together with UVA irradiation inactivate Human Immunodeficiency Virus Type 1 (HIV-1) with preservation of the surface epitopes on the virus. Longer irradiation times produce reactive oxygen species, selective to regions of the virus that do not affect surface epitopes recognized by neutralizing antibodies. This method of viral inactivation can be used towards the development of novel vaccine strategies using enveloped viruses. (From the Sept/Oct 2010 cover of Photochem Photobiol.*)*

Many commonly used vaccines, such as those for influenza, hepatitis A, and poliovirus, are prepared from inactivated viruses or viral particles, and are typically prepared by chemical treatment of live viruses. However, such chemical treatments can alter surface epitopes, making the vaccine less effective.

In the September/October issue of ***Photochemistry and Photobiology***, **Julie M. Belanger** and colleagues report their study of the effect UV radiation and diverse aryl-azido compounds on the inactivation of HIV-1. They found that not only did covalent binding of the aryl azides inactivate the virus, but long

irradiation times led to the production of reactive oxygen species, in regions that did not affect surface epitopes. They conclude that their methods may be useful for the development of inactivated virus vaccines.

Belanger JM, Raviv Y, Viard M, de la Cruz MJ, Nagashima K, Blumenthal R (2010) Characterization of the effects of aryl-azido compounds and UVA irradiation on the viral proteins and infectivity of human immunodeficiency virus type. *Photochem Photobiol* 86: 1099-1108.

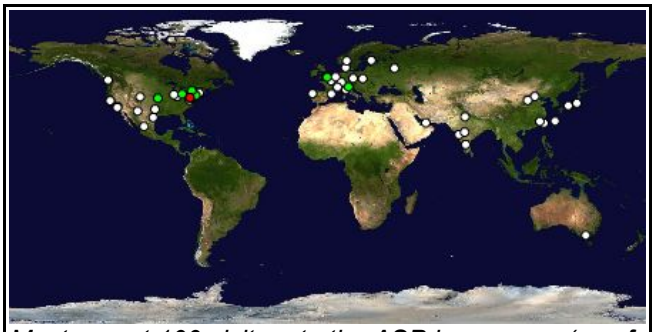
ASP Homepage Usage Stats

Visitation Summary

Dates: July 4-Sept 20, 2010 (79 days)

Total page views: 2807

Average page views per day: 35.5



Most recent 100 visitors to the ASP homepage (as of Sept 20, 4:40PM EST). Green indicates most recent 10 visitors. White indicates most recent 100 visitors.

Photobiology Events

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

Sept 24-26, 2010
Fifth Latin-American Congress on Photobiology and Photomedicine
Santa Cruz (Bolivia)
Web site:
www.allenpress.com/pdf/AnnouncementLatin-AmericanCongress1.pdf

Oct 6-9, 2010
Photodynamic Therapy and Photodiagnosis in Clinical Practice
Brixen/Bressanone (Italy)
Web site: www.bio.unipd.it/2010-PDT/

Oct 14, 2010
IES Baltimore Lighting Technology Conference: Free!
Baltimore, MD (USA)
Web site: lightingtech2010.eventbrite.com/?ref=ebtn

Nov 14-18, 2010
Sixth Asian Photochemistry Conference
Wellington (New Zealand)
Web site: www.confer.co.nz/apcnz2010/

Dec 15-20, 2010
PacifiChem 2010: The International Chemical Congress of Pacific Basin Societies
Honolulu, HI (USA)
Web site: www.pacifichem.org/

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 (I-APS)
Mendoza, Argentina
Web site: www.inifta.unlp.edu.ar/iaps21/index.html

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

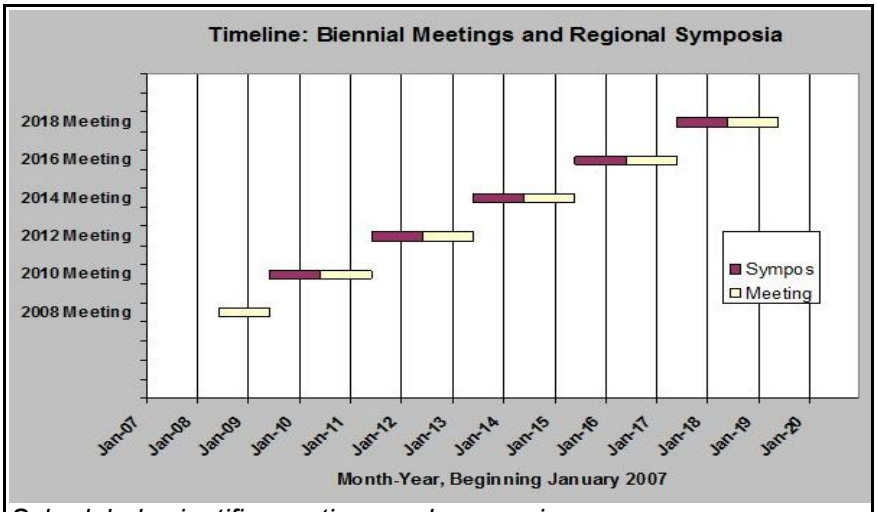
June 23-27, 2012
ASP-2012: 36th ASP Meeting
Montreal (Canada)
Web site: www.asp2012.org

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

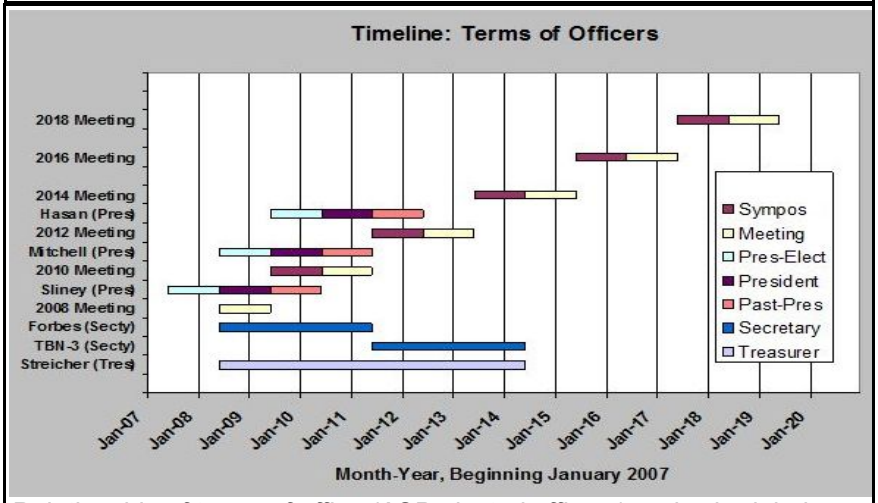
Other Event Calendars:

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

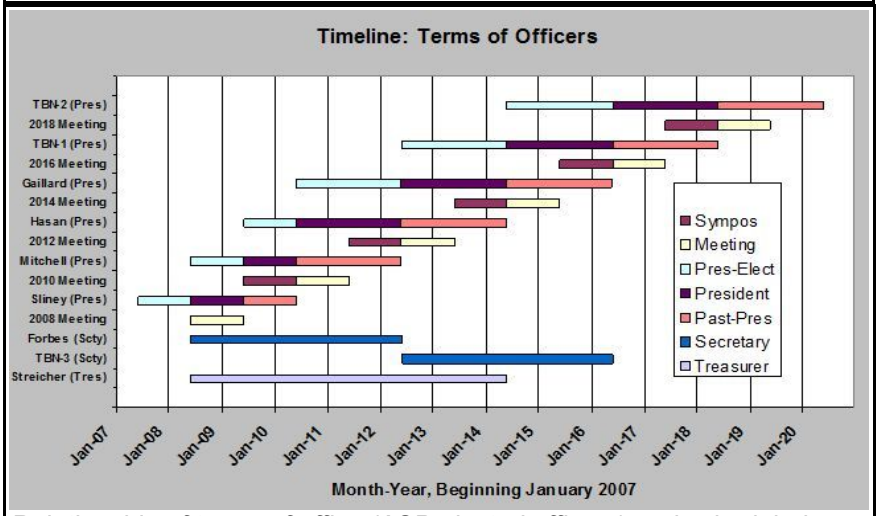
Original and adjusted timelines for meetings and corresponding terms of office. Amendments to the Constitution and Bylaws were ratified to accommodate the switch to biennial scientific and business meetings.



Scheduled scientific meetings and symposia.



*Relationship of terms of office (ASP elected officers) and scheduled scientific meetings, **under the prior constitution and bylaws**.*



*Relationship of terms of office (ASP elected officers) and scheduled scientific meetings, as approved by ASP Council and membership, **under the revised constitution and bylaws**.*