

ASP NEWS



Autumn 2011

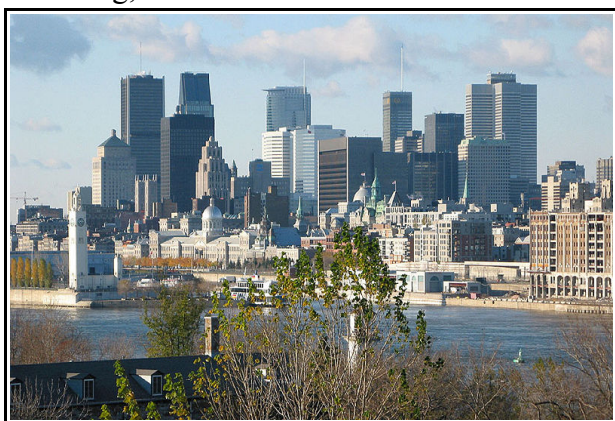
vol. 40(4)

Letter from the President

Hello ASP members!

I hope that all of you had a wonderful summer, are having a great autumn, and will ease into the winter mode.

This is my fall update on ASP activities since the last Newsletter in June. The sub-committees have been busy working on awards, membership, mentoring, and education.



The Montreal skyline (from Wikimedia Commons), site of ASP-2012, June 23-27, 2012.

David Mitchell and I have been busy organizing an exciting scientific program for our 36th meeting. We are happy to report that we have had a lot of input from the membership and this will make for a stimulating program. The preliminary schedule will be on our website soon.

As you know, the meeting is at the Delta Center-Ville, Montreal, Canada from June 23-27, 2012. This is also the 40th anniversary of the founding of the ASP, so it is a special year for us. We very much look forward to your participation.

The scientific program includes symposia on cutting edge optical technologies as well as the more traditional photobiology topics. Sessions include environment and photobiology, ultraviolet communication, photodynamic therapy, photo-

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vaccines, risks and benefits of artificial tanning, light effects in dermatology, and much more. ASP is committed to developing scientists for the future, so we have made special efforts to include networking and career development events. Thus, we have a grant writing workshop with personnel from the NIH and other agencies, poster sessions, and a variety of awards that will be presented at the banquet. The new awards this year include the *Photochemistry and Photobiology* Editor's Award for Outstanding Graduate Research, ASP Light Path Award, and ASP Photochemistry and Photobiology PhotoCite Awards. You can find details of these awards at our new website, to be launched very soon. Please feel free to participate in the nomination process, make suggestions for future awards, and suggest any other improvements the ASP should implement.

Equally important, Montreal is a great place for fun and culture. It is located in the southwest of the province of Quebec and is an important center

of technology, design, aerospace, pharmaceuticals, tourism, and world affairs. Montreal has been called "Canada's Cultural Capital" and is consistently rated as one of the world's most livable cities. Montreal has nine universities and twelve junior colleges within an 8 kilometer (5.0 mi) radius, and the highest concentration of post-secondary students of major cities in North America. The city is well connected with public local transport including airports, buses, subways, and commuter rails.

The Festival International de Jazz de Montreal (June 28-July 7) follows the ASP meeting. Montreal also has many other attractions including *Biodôme de Montréal*, Biosphere Environment Museum, Canadian Center for Architecture, and *Centre d'exposition de l'Université de Montréal*. Montreal is also well known for its bars, where some of the best scientific exchanges can occur. ASP has organized tours to make it easy for you to take advantage of Montreal's many cultural offerings.

-Tayyaba Hasan

Snell's Window



Snell's law describes the relationship between the angles of incidence and refraction as light passes through the boundary of two media that have different refractive indexes. An underwater viewer sees *Snell's window*, in which everything above the surface appears through a cone of light because of refraction of light entering the water. Based on Snell's law, this cone of vision is about 100 degrees wide, with "smears" from the waves. (Image from Wikimedia Commons)

Letter from the Editor

This month's newsletter provides you with lots of information about ASP-2012, which will be in Montreal from June 23-27 of next year. Our cover article by **Tayyaba Hasan** (ASP President) provides an overview of the meeting. An article on page 3 describes the ASP awards that will be presented in Montreal; these include three new awards, including one for students, that will be given to authors of outstanding recent articles in *Photochemistry and Photobiology*. An article by **Linda Hardwick** (ASP Secretariat) on page 6 briefly describes some of the many activities that Montreal has to offer. More information about Montreal is available at www.tourismemontreal.org/What-To-Do/Attractions and more information about our upcoming meeting will soon be available on the ASP-2012 web site, www.asp2012.org.

Finally, as noted on page 7, ASP will have a new web site design very soon. This marks my end as ASP webmaster. **Dennis Valenzano** was really ahead of the times when he began the ASP web site back in 1995. At the time of his original newsletter announcement (reprinted on page 7), Dennis had to explain the terms "link" and "web browser", the dominant players on the internet were AOL and CompuServe, and Google did not exist.

Once our new web site is up, I am sure that our Officers and Councilors will look forward to your feedback.

ASP News

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ASP Awards

The ASP is pleased to announce that the following awards will be presented at the 36th ASP Meeting in Montreal (June 23-27, 2012).

ASP Research Award

The "ASP Research Award" recognizes individuals who have made significant contributions with major impact in the fields of photomedicine, photobiology, photochemistry, and/or photophysics as represented by ASP. The Award is \$1000 plus travel (total \$1500) and a plaque. The successful recipient will be expected to present an award lecture at the 36th ASP Meeting that will take place June 23-27, 2012 in Montreal, Canada.

The following criteria will identify the best candidate:

- (1) The candidate may be self nominated or nominated by another member of the ASP and must have made a major research contribution to the photosciences.
- (2) The candidate must have at least 10 years of post-graduate (PhD or MD) research.
- (3) For equivalent candidates, preference is given to the candidate who has contributed most to the ASP.
- (4) The nomination package will stand for three years and can be updated yearly by the nominator. After three years, a new nomination package must be submitted.

Each submitted nomination should include **(i)** a signed nomination letter by an ASP member describing the candidate and major accomplishments that justify consideration for this award; **(ii)** an updated CV of the candidate; and **(iii)** up to two additional letters emphasizing the impact of the candidate's research.

The ASP Awards Committee is charged with selection of the recipient based on the criteria outlined above.

The individual must be an ASP member at the time of award acceptance and must commit to attending the biennial meeting and be present during the awards ceremony.

Deadline: Completed submissions should be received at the ASP office no later than **December 5, 2011**. When emailing your nomination, place ASP Research Award in the subject line and email to the ASP secretariat: lhardwick@allenpress.com.

ASP New Investigator Award

The "ASP New Investigator Award" recognizes promising quality research in the fields of photomedicine, photobiology, photochemistry, and/or photophysics performed at a relatively early stage in an investigator's career, typically within the first ten years of obtaining the terminal academic degree. In exceptional cases, senior scientists new to the photosciences will be considered. The Award is \$1000 plus travel (total \$1500) and a plaque. The successful recipient will be expected to present an award lecture at the 36th ASP Meeting that will take place June 23-27, 2012 in Montreal, Canada.

Each submitted nomination should include: **(i)** a signed nomination letter by an ASP member describing the candidate and major accomplishments that justify consideration for this award. Group/joint nomination letters are acceptable. The nomination letter should address research accomplishments and likelihood of continued excellence of the candidate and **(ii)** an updated CV of the candidate.

The ASP Awards Committee is charged with selection of the recipient based on nominations by members of the Committee and by ASP members. Self-nominations are accepted. The individual must be an ASP member at the time of award acceptance.

Deadline: Completed submissions should be received at the ASP office no later than **December 5, 2011**. When emailing your nomination, place ASP New Investigator in the subject line and email to ASP secretariat lhardwick@allenpress.com.

ASP Light Path Award

The "ASP Light Path Award" honors a researcher with substantial and innovative contributions to the fusion of photobiology with other disciplines,

thus broadening the frontiers of photobiology. The award will be delivered during the ASP biennial meeting and will be a personalized Plaque.

Each submitted nomination should include: **(i)** a signed nomination letter by an ASP member describing the candidate and major accomplishments that justify consideration for this award, and **(ii)** an updated CV of the candidate.

The ASP Awards Committee is charged with selection of the recipient based on nominations by members of the Committee and by ASP members. Self-nominations are accepted. The individual must be an ASP member at the time of award acceptance.

Deadline: Completed submissions should be received at the ASP office no later than **December 5, 2011**. When emailing your nomination, place ASP Light Path in the subject line and email to ASP secretariat: lhardwick@allenpress.com

ASP Photochemistry and Photobiology PhotoCite Awards

ASP PhotoCite Award A

(most cited original research article, 2007-2010)

“ASP PhotoCite Award A” will be given to the authors of an original research article in *Photochemistry and Photobiology*, the official journal of ASP, published during the last four years (2007 to 2010) that received the most hetero-citations (citations by others) during that period.

ASP PhotoCite Award B

(most cited review article, 2007-2010)

“ASP PhotoCite Award B” will be given to the authors of a review article in *Photochemistry and Photobiology*, the official journal of ASP, published during the last four years (2007 to 2010) that received the most hetero-citations (citations by others) during that period.

The recipients of both awards will be determined using data supplied by the publisher, Wiley-Blackwell, Inc. The award will be delivered during the ASP biennial meeting and will be a personalized Plaque.

Photochemistry and Photobiology Editor's Award for Outstanding Student Research

The “Photochemistry and Photobiology Editor's Award for Outstanding Student Research” will honor an individual who has published outstanding research in *Photochemistry and Photobiology* as a first author in 2009-2010, and was a graduate or undergraduate student at the time of submission.

The research article must have been published in the specified period or (if not yet in print) must have been accepted by the journal and published online.

The Award is \$600 toward travel expenses and a plaque.

In order to be considered for this award, the following application package must be submitted by the successful applicant:

- (1) pdf file of research paper published in *Photochem Photobiol* in 2009-2010 indicating first authorship;
- (2) brief documentation of student status at the time the original manuscript was submitted to *Photochem Photobiol*;
- (3) brief letter of support written by the research adviser detailing the research contributions the applicant made as a graduate/undergraduate student;
- (4) an updated CV of the candidate.

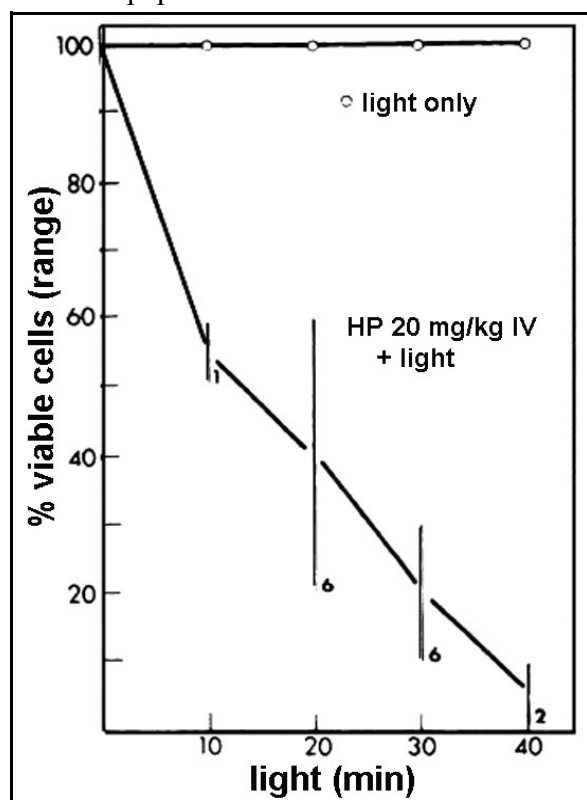
The successful applicant will be selected by members of the ASP Awards Committee and the *Photochemistry and Photobiology* Editorial Board. The individual must be an ASP member at the time of award acceptance.

Deadline: Completed submissions should be received at the ASP office no later than **January 31, 2012**. When emailing your nomination, place ASP Editor's Award in the subject line and email to ASP secretariat: lhardwick@allenpress.com.



Tale from the Archives

The topic of Photodynamic Therapy (PDT) has appeared with increasing frequency at ASP meetings, but it is perhaps not appreciated that a report on this topic was presented at the first ASP meeting in 1972. An abstract bearing the arcane designation 'WAM-C5' described the ability of hematoporphyrin to kill gliomacells in culture. Studies using rats and a rather primitive light source (150 watt light bulb) also indicated tumor destruction. It seems unlikely that an orthotopic model was used and cell death was assessed by trypan blue permeability. But the story was sufficiently interesting to elicit coverage by the local newspaper.



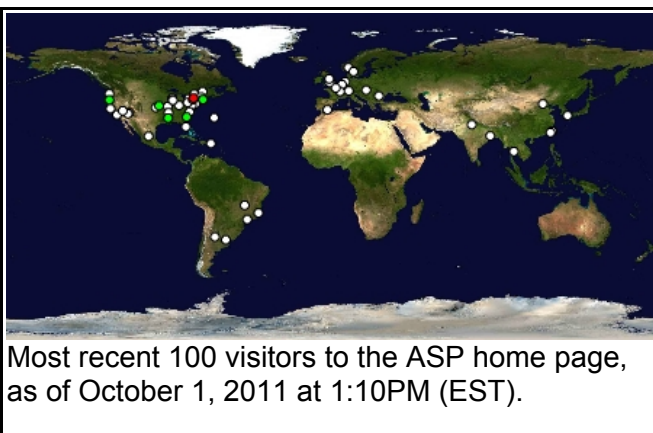
Ivan Diamond, the first author on the ASP abstract, published a report in *The Lancet* in 1962 and few subsequent papers in such reputable journals as *Cancer Research*. In these studies, the glioma cells were implanted sub-cutaneously and irradiated with a 1600 watt xenon arc lamp. Unfortunately, further progress in therapy of glioma has lagged somewhat, perhaps because this tumor tends to appear in the brain rather than under the skin of the rat.

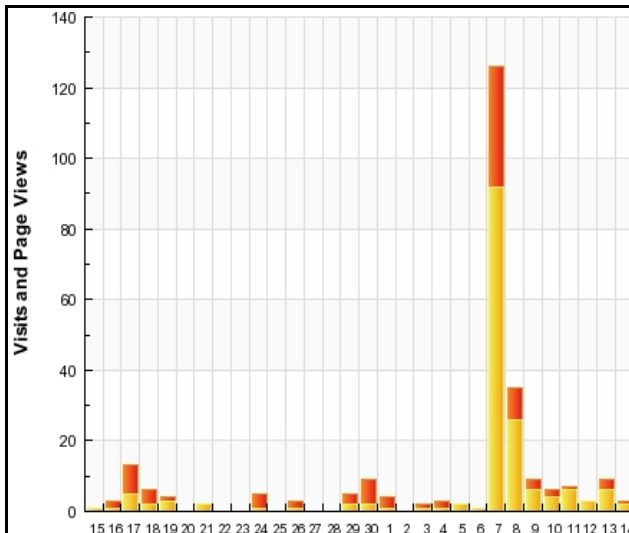
The image shown above is modified from **SG Granelli** et al. (*Cancer Res* 35, 2565-70, 1975). The output of a 1600-watt lamp (400-700 nm) was sent through a lucite cylinder in direct contact with the sub-Q tumor. This massive light dose provides some idea of the efficiency of a process involving a marginal *in vivo* photosensitizer like hematoporphyrin. If we assume that such a lamp will emit 5% of its energy in the visible region, and that hematoporphyrin absorbs ~2% of this light, we can estimate that the 40 min exposure needed to eradicate perhaps 2 logs of tumor = a big bunch of joules. But at least a beginning was made.

Tom Dougherty, the first investigator to put a major effort into PDT drug development, reported on his early results at the 1981 ASP meeting in Williamsburg and I organized the first PDT symposium at ASP the next year in Vancouver. This was my first exposure to ASP and it seemed remarkable at the time that the meeting organizers would permit a symposium to be organized by someone who was not even yet an ASP member. Tom later received the ASP Research Award (1987) and a Lifetime Achievement Award in 2001. Among past ASP Presidents with a significant PDT profile are **Linda Jones** (2007), **Charles Gomer** (1999), **Nancy Oleinick** (1998), **Albert Girotti** (1995), **Michael Rodgers** (1993), **Leonard Grossweiner** (1987), **Irene Kochevar** (1986), along with the current President, **Tayyaba Hasan**. This represents about 25% of our Presidents. Not a bad showing.

-David Kessel

ASP Web Site Stats





ASP Newsletter downloads from June 15 to July 15, 2011. The summer newsletter was announced on July 7.

where they live, play and display their unique *joie de vivre*.

You'll also experience a plethora of delights in music, theatre, dance, art exhibits, nightlife, cuisine, shopping and more... all merging in an exciting mix of traditional and avant-garde. With so much to discover, you don't want to miss Montréal!

The ASP has secured a room block at the Delta Center-ville for three days before and after our meeting to allow you time to enjoy the city. The Jazz Fest will begin the day after our meeting, so stay a few days to enjoy the Jazz Fest.

The meeting website will up be online soon with the tentative program and information about hotel reservations, abstract submission, tours, and other information you may need.

We hope to see you in Montreal!

-Linda Hardwick (lhardwick@allenpress.com)

Get ready for ASP-2012!

36th Meeting of the American Society for Photobiology à la Montréal



The Montreal Biosphere (from Wikimedia Commons), a museum devoted to environmental education.

Montréal features modern facilities and attractions against a backdrop of European history and charm. Between Mount Royal and the mighty St. Lawrence River, the downtown core and historic Old Montréal shine year-round with international festivals and events. Downtown Montréal is not only where people work, it's also

Research by ASPers Photochemical Damage of the Retina

Prolonged exposure to light can cause photochemical damage to the retina. Knowledge of the action spectrum (efficacy of different wavelengths of light) for this process has important implications for public health.

Dirk van Norren and Theo G.M.F. Gorgels (2011) The Action Spectrum of Photochemical Damage to the Retina: A Review of Monochromatic Threshold Data. *Photochem Photobiol* 87: 747-753.

The July/August issue of Photochemistry and Photobiology features an invited review article by **Dirk van Norren** and **Theo G.M.F. Gorgels** on the action spectra used to measure photochemical damage to the retina. An initial action spectrum for this process in the rat was similar to the absorption spectrum of rhodopsin. However, 16 more recent publications, which measured retinal damage using a different protocol, reported that the action spectrum decreases continuously from the ultraviolet to the longer visible wavelengths. The authors suggest several possible reasons for this discrepancy and several experiments that may

help to resolve this controversy.

-PAE

A totally blind process can by definition lead to anything; it can even lead to vision itself. **-Jacques Monod**

Blast from the Past!

Debut of ASP web site in 1995

A newly designed ASP web site will be up sometime in October of 2011, marking my end as ASP webmaster.

I thought this would be a good time to look back to a newsletter article by **Dennis Valenzeno**, the first ASP webmaster. In the newsletter article reprinted below, Dennis described the new ASP web site, which officially began on February 14, 1995. Note that Dennis mentions the need for a web connection or a modem and for some new-fangled software called a "browser". He also devoted a paragraph describing what was meant by "link".

-PAE

Welcome to Photobiology Online

Photobiology Online (POL) has arrived. With a network connection or high-speed modem, you can now retrieve photobiological information online using browser software such as Netscape or Mosaic. The address is http://www.kumc.edu:80/ASP/pol_v01.htm. Please use the number zero in "80" and in "v01", but use the letter "o" in "pol". Also, be advised that the server is case sensitive. This means that you must use capital and lower case letters exactly as shown above.

POL is a set of hypertext menus and text files that allow you to select a variety of information by simply pointing with your cursor and clicking your mouse button. You are presented with choices such as "What is photobiology?", and "What's new in photobiology?", as well as selections that provide more information about books, journals, meetings, reference data, and much more. More than 75% of the planned links are currently active, including information about this year's annual meeting and the fall

meeting of the European Society for Photobiology. Sorry, no glitzy graphics (yet)!

POL is currently a presentation of the ASP, but with a favorable outcome of deliberations for official approval by the European Society, it will become a joint project, as originally conceived. It has been constructed under the supervision of a committee consisting of Luke Newman (Scotland), Kendric Smith (Stanford), Tamas Vidoczy (Hungary), Joseph Warden (Rensselaer), and Dennis Valenzeno (Univ. Kansas). The University of Kansas Medical Center is hosting the site on its server system at no cost to the Society. A mirror site is currently being constructed in Hungary by Tamas Vidoczy.

Have a look. Let us know what you think, what changes you might like to see, and what information you can provide that would enhance the site. Text documents in electronic form (i.e., on disk or transferred via e-mail or ftp) are readily converted to net-viewable documents and can be easily incorporated into POL. These can be sent to Dennis Valenzeno at dvalenze@kumc.wpo.ukans.edu or to Department of Physiology, University of Kansas Medical Center, 3901 Rainbow Boulevard, Kansas City, KS 66160-7401.

21st I-APS Meeting

May 17-20, 2011 in Mendoza, Argentina

This recent event was the fourth meeting of the Inter-American Photochemical Society (I-APS) that took place in Latin-America. The first was in Iguazú in 1996, the second was in Ascochinga (Córdoba, Argentina) in 2001, and the third was Bahía (Salvador, Brazil) in 2006. This five year rhythm permits assessment of how much the Latin-American photochemical community has grown, how much research projects have progressed, and how new research lines get established. The meeting also naturally tightened or established scientific ties between Latin-Americans (especially the young) and their North-American and European colleagues. The meeting was held in the Aconcagua Hotel and Convention Center, one of several hotels in Mendoza.

Mendoza is a very vital city and very well known for its excellent wines and mountains, the highest in the Andes.



The scientific program included presentations by **Pedro Aramendía** (Argentina), **Ana Moore** (USA), **Gonzalo Cosa** (Canada), **Mónica González**, **Valeria Kleiman** (USA), **Teresa Atvars** (Brazil), and **Elsa Abuin** (Chile). The local organizing committee was formed by **Beatriz Barja**, **Mónica González**, **Carolina Lorente**, **MaríaJulia Roberti**, and **Andrés Thomas** (all from Argentina).

More info on the 21st I-APS Conference
www.inifta.unlp.edu.ar/iaps21

All 31 lectures were followed by lively discussions and comments. **Tito Scaiano** (Canada), ASP member and former editor of *Photochemistry and Photobiology*, opened the lecture session with “Plasmon transitions and their application in organic chemistry”. Many of the lectures were excellent, but the lecture by **Dwayne Miller** (Canada and Germany) “Making the molecular movie: first frames...coming features”, deserves a very special comment because he fascinated the audience with a description of his group’s 14 year-long effort to develop the now-ready “ultrabright electron source capable of atomically resolving structural dynamics with 100 femto-second time resolution”. He said, “We have the technique, now we need biological samples”. So, let’s go to work with him!

Two special lectures are always a highlight in the

I-APS meetings. The Cilento Award for a young scientist was given to **Laura Dántola** (La Plata, Argentina), who gave a talk on “Production and quenching of reactive oxygen species by pterin derivatives”. The Closs Prize lecture was by **Kevin Stamplecoskie** (Ottawa, Canada), “Using the plasmon absorption of silver nanoparticles to a maximum”.

Three very lively poster sessions allowed the younger colleagues and students (as well as the not-so young) to present and discuss their results in a very friendly atmosphere. A total of 114 posters were presented during the three sessions. It was nice to see the participation of colleagues and young students from Colombia, Puerto Rico, and Mexico, in addition to the larger number of colleagues from the USA, Canada, Chile, Brazil, and Argentina.

Jean Cadet, Editor-in-Chief of *Photochemistry and Photobiology*, also attended the meeting and announced that a Symposium-in-Print will be published as special issue that includes lectures presented at the meeting. **Gonzalo Cosa** and **Andrés Thomas** will be the guest editors of this issue.

-Silvia E. Braslavsky

Evolution of the Textbook

Publishers are beginning to go digital with textbooks, pushing boundaries to give students a personalized, interactive experience

The ink hadn’t dried on the first edition of *Molecular Biology: Principles and Practice* when its scientist authors began dreaming up ideas for the second. They would go way beyond words on the page to give students a front row seat to science in action.

It was the summer of 2010, and the collaborators had just met with **Adam Steinberg**, the book’s artist. On his newly minted iPad, Steinberg showed them a splashy periodic table application called *The Elements: A Visual Exploration* that rocked their world.

The app included cleverly worded facts and scintillating periodic table trivia. But its real

impact was visual. Its creator, scientist **Theodore Gray**, had gathered a mini-museum's worth of fascinating objects to represent each element—from an iridescent hunk of bismuth to a dime-store dragon figurine made of copper. App users could see the objects in 3-D and rotate them, front to back and front again, with the swipe of a finger.

It wasn't quite holding an object and turning it over in your hand, but it was pretty close.

Jennifer Doudna, an HHMI investigator at University of California, Berkeley, and coauthor of the textbook, marveled at how the app transcended the traditional boundaries of a textbook. "When I was in college and learning [molecular biology] for the first time myself, I found the textbook approach very dry," she says. "It really did not give a sense at all of science being a living, breathing, growing, changing kind of field."

In the first edition of *Molecular Biology*, Doudna and her coauthors **Michael M. Cox** and **Michael O'Donnell** had set out to humanize their subject matter almost entirely within the confines of the printed page. For instance, they opened each chapter with a first-person vignette from a scientist talking about a moment of discovery.

But Steinberg's tablet computer demonstration got them dreaming about adding video versions of the vignettes that students could tap into as they read. They imagined 3-D animations and virtual experiments where students could choose their data sets and follow them through to the outcome.

"We have ideas and the ground is definitely shifting quickly," says O'Donnell, an HHMI investigator at Rockefeller University. "We're all thinking about it and we're all very excited."

So what will college science textbooks look like in five years? A decade? The boundaries have already stretched beyond the physical page to incorporate animations of molecular processes, videos of scientists talking about discoveries, and social networking between researchers and students around the world. Publishers are offering content that teachers can customize as they see fit. However, a flock of unknowns is circling—Will the iPad prevail? Will the cost for developing

spectacular apps be more than students are willing to pay?

Jonathan Crowe, an editor in chief at Oxford University Press who works with science authors, predicts the textbook industry will change more in the next few years than it has in the past 50 or 100. And plenty of new and traditional publishers are moving fast to stake a claim to that future.

Still a Small Market

College textbooks are big business. Higher education textbooks sales were \$4.58 billion for 2010, an increase of 7.8 percent since 2009, according to U.S. publishers' net sales revenue released by the Association of American Publishers in February.

Digital textbooks, however, make up roughly 5 percent of the textbook market, says Vikram Savkar, publishing director at Nature Publishing Group (NPG), which will soon launch its second college-level digital initiative. Other numbers bear this out: for John Wiley and Sons, a major publisher of science textbooks for the higher education market, \$10 million of its \$290 million in higher-education revenue last year came from digital-only sales (titles not packaged with a print textbook)—that's 3.5 percent of the company's higher-education revenue.

"Everybody in the market says it's time to go digital, yet year after year people still spend most of their money on print textbooks," says Savkar. "I personally believe that's because there haven't been digital projects that have come out yet that are really exciting to the market and that are designed to be effective replacements for textbooks."

A New Entity

Matt MacInnis, CEO of an interactive publishing company called Inkling, says "textbook" is too narrow a term for the new kind of learning content his company is developing. An alumnus of Apple's international education division, MacInnis envisions traditional print textbooks being replaced by a new generation of media-rich learning platforms.

Inkling, which was born in 2009, takes existing textbooks (and their supplemental online content like animations and self-assessment quizzes),

“gently disassembles” them, and then reassembles them for multitouch tablet devices like the iPad. For example, Inkling’s version of *Hole’s Human Anatomy and Physiology* features 400 interactive “exhibits” embedded in the text, including 3-D animations, anatomical diagrams where students can make the labels disappear and test themselves, and interactive quizzes that give instant feedback. Students can highlight passages with a finger swipe, swap ideas onscreen with friends on blue “sticky notes,” and read handy annotations, in purple, from their teachers.

Brown University School of Medicine recently bought into the Inkling concept. Its incoming first-year students, 108 of them, will be required to purchase an iPad and will use six Inkling titles as their textbooks for core preclinical classes.

NPG, publisher of the journal *Nature*, is finding ways to make scientific instructional content more accessible to students. In January 2009, NPG unveiled a free collaborative learning site called Scitable, “as a personal research space for undergrads and high school students with a deep love of science,” Savkar says. Users can access a growing library of original content as well as previously published material from *Nature*, mostly in genetics, cell biology, and ecology.

“Eventually it will have coverage across all of biology,” he adds. Instructors can assign readings, asking students to explore them at their leisure, plus students can log on and ask questions of scientists, communicate with students in other parts of the world, and read student-written blogs on topics like global warming and neuroscience.

The second NPG project is a \$49 interactive digital *Principles of Biology* textbook that will debut in September 2011 at three California state university campuses. *Principles of Biology* sets out to combine the scientist-produced content and high-quality illustrations of a print textbook with primary literature from *Nature*, as well as animations, assessment tests integrated into the lessons, and interactive simulations of concepts that students can manipulate.

“When I was in college and learning [molecular biology] for the first time myself, I found the textbook approach very dry. It really

did not give a sense at all of science being a living, breathing, growing, changing kind of field.”

-Jennifer Doudna

“Wherever possible, we try to get the student actively engaged,” Savkar says. A “Build a Fly” module, for example, allows students to choose different types of genetic material for a fly and then see how the phenotype changes with their choices.

Students can access the material on a desktop, laptop, smartphone, or tablet. They can also print one color copy of the textbook for free. If teachers want to customize the content—as 25 to 35 percent of instructors have indicated to NPG—the digital textbook will automatically rearrange itself as requested.

Free updates will come continually, after review by an editorial board. “We’re looking at this as a living edition,” says Savkar.

An Investment

Issues of price, always a hot topic among cash-strapped college students, are complicated. E-textbooks cost about half the price of print. Inkling’s titles generally cost 15 percent more than e-books, but students can pay as they go for the content at \$2.99 per chapter. Teachers can pick and choose chapters for a course, so if they need only 15 chapters, students pay \$45 instead of \$180 for the full 60-chapter book.

Still, students will need to shell out the \$500 or more for the tablet device. And interactive publishers who develop iPad content may save on printing and paper, but they will have higher development costs for the multimedia features, says **Alison Pendergast**, senior vice president and chief marketing officer at Jones and Bartlett Learning, a large U.S. college textbook publisher.

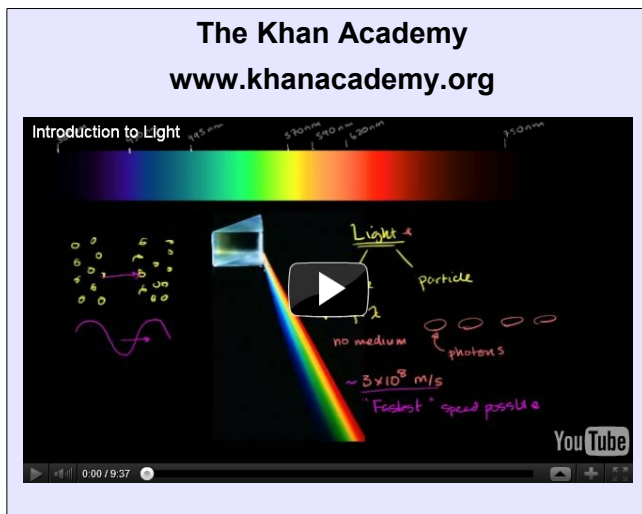
“I don’t necessarily think technology is going to drive down the cost of textbooks,” says Pendergast. “If anything, it’s going to keep them priced where they are. All of those additional components—animations, simulations, and interactivity—are expensive to develop.

“We’re continuing to try to find business models that keep the resources affordable for students but

at the same time are cutting edge. It's hard to do this stuff cheaply—and in order to do it well, there has to be investment.”

The nonprofit E.O. Wilson Biodiversity Foundation estimates it will need \$10 million to develop a 59-chapter digital biology textbook called *Life on Earth*. But the foundation plans on paying for it with money from private and public donors and making the textbook available to the public for free.

HHMI investigator **Matthew Scott**, a professor at Stanford University and coauthor of *Molecular Cell Biology*, is a fan of another nonprofit site with free content, Khan Academy. Developed by an MIT graduate named **Salman Khan**, the site offers upward of 2,000 video tutorials that consist of scrawled notes and colored doodles on an electronic blackboard, with Khan's voice explaining it all. The content leans heavily toward precollege math and physics but also includes dozens of higher-level biology and organic chemistry videos. Teachers can have their students log on as a class, then direct them to particular videos and assessment exercises and track their process.



“It’s enormously well done,” says Scott. “I use it, my kids use it, and friends who are Stanford faculty use it.”

Effective Teaching

At Harvard University, students may be fused to their iPads in their off hours, but they’re not using them in their undergraduate biology classes yet. Instead, teachers rely on the latest in interactive

technology such as animated movies that illustrate cellular processes and handheld clickers to gauge the class’s understanding of a particular concept and drive discussion.

“After watching an animation of, say, the transport of proteins across a nuclear envelope, we’ll have a discussion of the core process that’s being shown,” says **Robert Lue**, a professor of molecular and cellular biology and director of Life Sciences Education at Harvard University as well as an HHMI undergraduate program director. “But then we’ll have a discussion in the context of a living cell—what are some of the things we didn’t show and how are they going to affect the process we’re talking about?”

“It’s both a very rapidly expanding area and one where there are still a lot of things that haven’t been settled yet. That means the life sciences courses and textbooks are constantly responding to revisions of fundamental paradigms.”

-Robert Lue

“It becomes a real teaching tool, not like a passive look at something,” says Lue, who runs Harvard’s Biovisions program for digital animations.

The landscape of textbooks is changing rapidly, says Lue, but he’s less interested in whether it brings the latest whizbang interactive features to a nearby screen than in how it’s changing to meet teachers’ increasingly well-defined and precisely planned pedagogical goals. Textbook authors used to focus just on clearly explaining concepts, but “authors now have to spend a lot of time thinking not just about how to present something but about how to teach it,” says Lue.

“In the past, textbooks were simply laying out the information in the written word with still diagrams that were clear. But there is so much we have learned about how best to teach material, how best to use interactivity and activity-based learning methods,” he says. For example, students in biology, computer science, and visual art courses can work together to develop their own scientific animation.

“It’s not just the material between two covers,” Lue says. “It’s also a whole program in terms of

how to teach more effectively.”

“The textbook is always there as a framework,” says **Dennis Liu**, who heads HHMI’s education resources group, which produces materials to supplement textbook content for HHMI’s Biointeractive website. “We have to be mindful of what teachers are teaching now while also exposing them to new content and ideas and helping them to inject cutting edge research into their curricula.” Liu hopes to see BioInteractive animations, some of which are being adapted for smart phones and the iPad, become incorporated as digital assets in new textbook-like products. “I can imagine future partnerships with authors and publishers to custom design some of our media to match new digital textbook content,” says Liu.

HHMI's Biointeractive Web site
www.hhmi.org/biointeractive/

Nonstop Updates

One dilemma in the life sciences is how to distill into a single course the “enormous explosion” of information that has come with breakthrough discoveries in the past 20 to 30 years. “It’s both a very rapidly expanding area and one where there are still a lot of things that haven’t been settled yet,” says Lue. “That means the life sciences courses and textbooks are constantly responding to revisions of fundamental paradigms.”

With two or three competing models for a particular idea, Lue says the current challenge for textbook authors is to assess the entire spectrum of materials and choose which examples best illustrate fundamental principles. “We have to help instructors use the material most effectively, rather than just handing it over,” says Lue.

For HHMI investigator Matthew Scott, a particularly compelling part of textbook authorship is distinguishing discoveries that are of enduring value from those that are merely in vogue.

“You don’t want to put in too many of the latest hot things that are perhaps wrong or less important than they may seem at the moment,” he says. “Yet you want the book to seem up to date, so you’re doing a balancing act.”

Oxford University Press’s Jonathan Crowe says with the ability to change digital content at will, it will be “fascinating” to see whether authors will be constantly updating things to keep pace with the latest discoveries, or stick to the old way of curating.

“In theory, their task could never end,” he says. “The molecular biology team I work with, at least they’ve got a couple of years without me breathing down their necks. I could be on them every month, and it could never stop.”

He suspects there will be incremental updates rather than constant ones, and then new editions every three years. For more topical matters, “that’s where things like social networking could come in,” says Crowe. “You could have a Twitter feed associated with the book if a discovery comes in. Anybody who’s following that feed will see it has happened and then go have a look at this journal for this particular advance.” And then when the new version of the textbook comes along, “the authors can build it into the narrative.”

The Best of Both

So while authors and educators wend their way through the digital morass, will the paper textbook soon go the way of cave drawings and illuminated manuscripts? Or will students cling to the textbook because sitting in the grass and highlighting a page with a yellow marker is just simpler than highlighting electronically?

The best print textbooks, especially for upper-level courses, will probably not go away as fast as people anticipate, says Pendergast. “It’s still a pretty functional tool.”

“When you’re trying to learn math or chemistry or physics, and this stuff is really hard, I think people use the textbook as a life vest. It’s insurance—you grab onto it and hope that it’s going to provide the explanation you need to understand the concepts you’re trying to learn.”

The advantage of digital content, she says, is that it personalizes the learning experience, so students can process information at their own pace and use visuals to enhance their understanding of the material.

“Instead of reading 20 pages on the Civil War or

Civil Rights Movement, they could go on a website and see a video of **Martin Luther King**,” she says. “They could see and read original text from MLK and **JFK** and get a much more visual experience over time.”

The iPad is a physical object, too—and one that weighs a mere 1.35 pounds, making the textbook seem more like a millstone than a life vest. In the second edition of *Molecular Biology: Principles and Practice*, Doudna hopes to fuse the best of print and digital. “I doubt there will be less text, frankly, because we’ve found that faculty want quite a high level of discussion about experimental findings.

“But expanding into other kinds of media like the iPad will allow us to give people more options. We could pick any sort of topic in molecular biology and have an application that would allow students to get real-time information about that concept. We could have discussions with practicing scientists kept very up to date with interviews as new discoveries are made.

“Or it could be a hands-on demonstration of the discovery, showing them data and walking them through how one does the experiment.”

Doudna hopes to have all that out in three years. “We just had our booksigning party [for the first edition], and our publisher said, ‘Don’t relax. In a few months I’m going to be calling you.’”

-Laura Putre

(reprinted from the *HHMI Bulletin*, with permission)

Education, *n.*: That which discloses to the wise and disguises from the foolish their lack of understanding. - **Ambrose Bierce**, *The Devils Dictionary*



In Memoriam, Ronald W Ignatius (October 1939 – January 2011)

While we mourn the loss of Ron Ignatius, we celebrate his life and achievements in the science of light. Ron was born on October 10, 1939 in Chicago, IL, a son of the late Frank and Mary (Glenn) Ignatius. He graduated from Maine Township High School in 1958 and on April 22, 1961, he married his high school sweetheart, Judy Craiger. Ron and Judy have 3 sons, Joseph, Glenn and Matthew.

He was a large man with a large heart and a larger-than-life personality who enjoyed spending time with his family, especially his eight grandchildren, and his beloved four legged friend, Cassie.

Ron was the founder and Chairman of the Board for Quantum Devices, Inc. and Quantum BioMedical, Inc. Ron holds of a number of patents relating to LED applications, including one on the use of LEDs as a plant lighting source. This patent was described by the U.S. Patent Examiner as "the most pioneering technology in plant husbandry I have reviewed in my 30 year career."

Ron presented a paper at the 1995 AIAA Space Programs and Technologies Conference on monolithic solid state plant lighting units. This led Mr. Edward Gabris of NASA to invite him to present a paper on his experiences in commercializing SBIR results in a Phase 3 program. Ron was co-chair of the session on SBIR at the 1st Conference on Commercial Development of Space in 1996. These invitations and conference responsibilities are a reflection of his recognition as a successful small business entrepreneur.

Ron's invention for plant growth on the international space station set the stage for NASA's use of LEDs in medical applications and his prestigious Space Technology Hall of Fame Award in 2000. Ron used over half of all NASA SBIR dollars along with his own personal funds to promote the research of light as a healing instrument, and devoted more than 18 years to the science of light.

-Robin Schumacher

Photobiology Events

Interactive Map/Table:
www.pol-us.net/meetings.html

Nov 14-15, 2011

Can Solar Power Deliver?
London (England)
Web site: royalsociety.org/events/solar-power/

Jan 21-26, 2012

SPIE Photonics West
San Francisco, CA (USA)
Web site: spie.org/x2584.xml

Jan 21-27, 2012

GRC: Photosensory receptors & signal transduction
Galveston, TX (USA)
Web site: www.grc.org

Jan 29-Feb 3, 2012

GRC: Pineal cell biology: Links to circadian clocks, sleep and metabolism
Galveston, TX (USA)
Web site: www.grc.org

Apr 16-20, 2012

SPIE Photonics Europe
Brussels (Belgium)
Web site: spie.org/x12290.xml



"Beer Brussels sprouts", from
www.thechocolateofmeats.com

Apr 18-22, 2012

ASLMS: American Society for Laser Medicine & Surgery
Kissimmee, FL (USA)
Web site: www.aslms.org

Jun 3-8, 2012

GRC: Multiphoton Processes
June 3-8, 2012
South Hadley, MA (USA)
Web site: www.grc.org

Jun 23-27, 2012

GRC: Photosensory Receptors and Signal Transduction
Galveston, TX (USA)
Web site: www.grc.org

June 23-27, 2012

ASP-2012: 36th ASP Meeting
Delta Center-Ville
Montreal (Canada)
Web site: www.asp2012.org



Jul 7-13, 2012

GRC: Photosynthesis
Davidson, NC (USA)
Web site: www.grc.org

Jul 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

Jul 20-24, 2013

Plant Biology 2013
Providence, RI (USA)

Aug 31-Sep 3, 2013

European Society for Photobiology Congress
Liege (Belgium)

All Submissions to:
ensmingr@twcny.rr.com

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\$308/2-yrs Member (printed version and online access to *Photochem Photobiol*)

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36th Meeting of The American Society for Photobiology (ASP 2012)

www.photobiology.org



June 23-27, 2012

Delta Center-Ville, Montréal, Canada

Chairs:



Tayyaba Hasan

Massachusetts General Hospital
Harvard Medical School



David Mitchell

University of Texas MD Anderson
Cancer Center



Topics include

- Emerging Technologies in Photobiology
- Photobiology in Extreme Environments
- Artificial Tanning: Risks and Benefits
- Oxygen Effects and Optical Probes
- UVA, Sunscreens and Melanoma
- Magnetomotive Optical Imaging
- Photochemical Internalization
 - DNA Damage and Repair
 - Photodynamic Therapy
 - Nanotechnology
 - Optogenetics

Networking Events

- Mentoring Lunch
- ASP-ESP Symposium
- Posters, Prizes, Reception
- NIH Grant Writing Workshop
- Associate Member Travel Awards
- Banquet, Entertainment and Awards

Enjoy Montreal Attractions and Jazz Festival

Festival International de Jazz de Montréal - June 28 - July 7, 2012