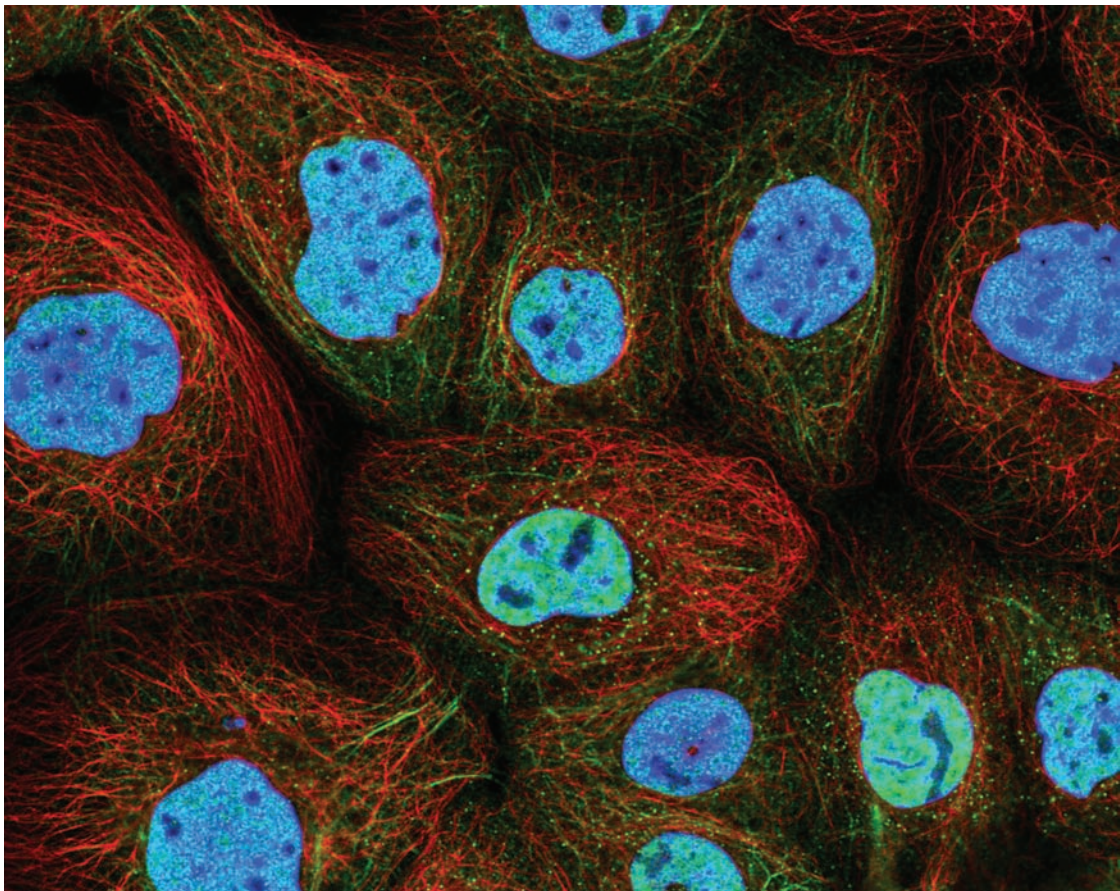# SCIENCE EDITOR

A Publication of the Council of Science Editors

In this issue

- *Perspectives on Authorship*
- *Semantic Tagging: How Smart is Your Content?*
- *The New CSE Logo and Web Site*

SCIENCE EDITOR

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Cover image: Human epidermal carcinoma cells stained with fluorescent-labeled antibodies. Green shows the location of the protein SMARCA2 that is involved with regulating the transcription of certain genes essential for the growth of tumor cells. The image also shows cytoskeletal intermediate filaments in the cytoplasm. Red shows microtubules in the cytoplasm, and blue shows DNA in the nucleus. The image is from The Cell Image Bank (http://www.cellimagelibrary.org/images/40479) and is used under a Creative Commons Attribution Non-Commercial Share Alike License. The original image can be found on The Human Protein Atlas Web site (http://www.proteinatlas.org/search/HPA029981%3A+A-431).

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Science Editor Online

Transitions and Embracing Change

You'll have noted CSE's new logo on the cover of this issue of *Science Editor*. The logo is a fresh version of the pen in a flask in a circle that CSE has used since 1978. Along with a new logo, CSE recently released a sparkling new Web site and an updated version of the style manual *Scientific Style and Format*. You can read all the details of these changes in this issue.

Many articles in this issue address embracing change in various facets of publishing: semantic tagging of content for better discovery, implementing ORCID identifiers, moving journals online, developing social-media strategies, developing a new citation scheme, and adding postpublication peer review to the peer-review process. CrossRef is adding features, authorship policies are changing, and the Sunshine Act now requires reporting payments to physician–authors. Publishing continues to change quickly. In the midst of all this change, there are efforts to preserve scholarly content already produced; read the article about the CLOCKSS archive that seeks

especially to assure libraries that as content transitions to online, they will have permanent access to the journals for which they have chosen to buy subscriptions.

We've added a glossary to this issue to help junior members (and even seasoned publication professionals) to swim through the alphabet soup of acronyms that they hear alluded to in publishing circles. Other special features include the report of publication topics discussed at the American Association for the Advancement of Science annual meeting and a new Solution Corner focusing on plagiarism-detection tools.

With this issue, I also announce a personal transition. This is the penultimate issue of *Science Editor* under my editorship. When you read this, I will be nearly finished putting together the summer issue, my final issue. However, my main goal as I rotate from editor-in-chief to the presidential track on the CSE Board of Directors will be to continue to find ways to ensure that the editorial model of *Science Editor* is

Patricia K Baskin
Editor-in-Chief, *Science Editor*

sustainable and that it continues to provide educational and newsworthy articles for CSE members.

I thank all the members of the editorial team listed on the masthead below, whose photos are shown on page 71 and who have contributed their time and talents to help me bring *Science Editor* to our members during my tenure.

Authorship and Contributorship: Who Did What?

Patricia K Baskin

This issue's Ethical Editor column addresses the topic of authorship in scholarly journals. The column discusses requirements for authorship, author order, inappropriate authorship (gift, guest, and ghost authors), and the increasing numbers of authors in bylines.

Increasing technological development fosters global collaboration among authors in different disciplines and consequently leads to the proliferation of authors on papers. Contributing to confusion about who did what for journal articles is the existence of a variety of publishing forums (including blogs and data repositories) whose authors report and interpret research findings. Publishers, funding agencies, academic institutions, and commercial enterprises, as well as the public, face challenges in determining the contributions that individual authors listed in a byline made to the conduct and reporting of the research. The lack of transparency of the roles played by different authors in a byline is a problem.

Authorship standards were not defined in any studied way by most of the publishing community until 1985, when the International Committee of Medical Journal Editors (ICMJE)[1] published a statement on authorship criteria. In the late 1990s and early 2000s, ICMJE and others recommended a contributorship model, which was adopted by few journals. According to the ICMJE criteria, until fall 2013, every byline author

1) Had to have made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data.
2) Had to have drafted the article or revised it critically for important intellectual content.
3) Had to have approved the version to be published.

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In 2013, ICMJE added another criterion: 4) agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work were appropriately investigated and resolved. ICMJE states that anyone who contributes to a study but does not meet all four criteria should be listed in acknowledgments rather than in the byline.

ICMJE encourages journal editors to develop contributorship policies that require authors to list their specific contributions, but journal editors do not commonly do so. Specific information about author roles would, however, contribute to greater transparency.

In general, the ICMJE guidelines function as intended as long as authors follow them. The problem is that the guidelines are often disregarded because many contributors to a research paper do not meet all four criteria. In the minds of many authors, the four ICMJE criteria are impractical and do not mesh with the culture of assigning authorship in research groups. For instance, a person who designed a study (criterion 1) but who did not draft or revise the manuscript (criterion 2) would need to be excluded from the byline if an author group followed the guidelines (ICMJE now exhorts author groups to give those who qualify only for criterion 1 the opportunity to meet criteria 2 and 3). A researcher or medical writer who provided intellectual input on a paper for a pharmaceutical company may fulfill criterion 1 or 2 or both but not be listed as an author because he or she was not among those who approved the final version (criterion 3).

In 2007, *Neurology* encountered several situations in which academic authors were invited to be paid "guest authors" of papers that had been written by commercial entities (pharmaceutical and medical-writing companies). The editors decided to redefine the journal's authorship criteria in hopes of avoiding guest and ghost authorship.[2,3] The editors also decided to simplify the criteria and strengthen the contributorship model by requiring specific statements of contributions from the authors so that

readers could tell who did what—research, writing, funding, and so on. Since the criteria were redefined and the requirement put in place for providing information about who did what, all authors have been required to state their contributions to the research or writing (completing an exhaustive checklist is mandatory), and their contributions are stated in the journal; authors are responsible for the contributions that they made, not for the entire article. The editors also believed that adherence to these criteria would enhance the professionalism of medical writers and give them credit for their intellectual contributions.

Neurology's three criteria are[4]

1) Design or conceptualization of the study.
2) **OR** analysis or interpretation of the data.
3) **OR** drafting or revising the manuscript for intellectual content.

The first two *Neurology* criteria are derived from ICMJE criterion 1; the third is derived from ICMJE criterion 2. Final approval, ICMJE's criterion 3, is received from all authors in *Neurology*'s electronic tracking system during the review process, so this requirement is not stated separately in *Neurology*'s author criteria. Only one of *Neurology*'s three criteria is needed to qualify a person for authorship.

Professional writers employed by pharmaceutical companies or other academic, government, or commercial entities who have drafted or revised the intellectual content of the paper must be included as authors according to *Neurology*'s criterion 3. This requirement recognizes that those who first draft a manuscript or revise it for intellectual content are able to frame the manuscript in a way that may influence the reporting and interpretation of the findings. The editors of *Neurology* believe that these writers should be named in the byline and their disclosures gathered as for all other authors.

Contributors who do not qualify for authorship are listed either as

How Smart Is Your Content? Using Semantic Enrichment to Improve Your User Experience and Your Bottom Line

Michael Clarke and Pam Harley

Scholarly publishers—especially those in the scientific, technical, and medical fields—are increasingly enriching their content with an array of metadata with the aim of ensuring that content is distributed broadly, adaptable for multiple purposes, and rendered interoperable with other relevant content. Such metadata include digital object identifiers, ORCID identifiers, FundRef identifiers, PubMed links, GenBank sequence identifiers, and International Standard Name Identifiers. The options available continue to grow, and the value added to content grows as well. *Semantic enrichment* is an additional class of metadata that further improves the utility, discovery, and interoperability of content.

What Is Semantic Enrichment?

Semantic is often used in combination with terms such as *enrichment*, *tagging*, *markup*, *indexing*, *fingerprinting*, *classification*, and *categorization*. Although there can be important distinctions among these terms, they tend to be used loosely and interchangeably. In this article, we'll use the catchall term *semantic enrichment* to refer broadly to the various technologies and practices used to add semantic metadata to content.

So, what is semantic enrichment?

A Topical Layer of Metadata Added to Content

Semantic enrichment is the process of adding a layer of topical metadata to

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content so that machines can make sense of it and build connections to it. Content in scientific articles and books is written so that humans can understand it, but computers have a hard time interpreting the nuances of human language. Given the explosion of available information—especially in the sciences—people have become reliant on computers to find the information that they need. Semantic metadata provide the answer to an important question, "What is the *meaning* of this content?" in a way that computers can process so that they can find, filter, and connect information.

Semantic metadata can be added to document markup (such as XML) to allow containers of information (such as journal articles, book chapters, guidelines, learning modules, and quizzes) to be broken into component parts so that the information can be acted on as distinct units of knowledge. Think of it as a content architecture through which a machine not only can understand that a chapter is made up of title, authors, sections, paragraphs, tables, figures, and so on but also can understand the topic and in some cases even the meaning conveyed by each component.

Once you have this topical map in the form of semantic metadata applied broadly across your content, you can automatically retrieve and organize information not just by its container but by its topic. For example, a medical publisher could pull together all relevant content on the topic of atrial fibrillation from all of its content types: journal articles, book chapters, clinical guidelines, continuing education, patient information, and more.

Semantically enriched XML is sometimes referred to as smart content because it holds within itself everything that an

application needs to interpret it—both structurally and topically. **Figure 1** shows the increasing value of content as increasingly rich markup is added.

How Is It Done?

The practice of adding semantic metadata to content is often called *semantic tagging*. A variety of technologies, methods, and practices can be used to enrich content with semantic metadata: Tagging can be embedded directly in XML files or can be held externally in databases or content-management systems that reference elements in the content. For content that is not easily accessible, such as videos and images, tagging can be placed in metadata headers. More important than the exact method is that tags can be matched to specific elements in a document at the appropriate level of *granularity*.

Semantic tagging can be done at different levels of granularity in content. Tagging should be just granular enough to "atomize" content at a level that your customers will find appropriate and useful. Tagging can be done at the "top" of a container of content, for example, at the article level. Topic-collection tagging is one example of top-level semantic tagging. Tagging can also be applied deeper within a work; some systems tag major sections of a work, tables, and figures. Some go even deeper, tagging at the paragraph or even the sentence level. Named-entity recognition (also called entity extraction) is a granular form of semantic tagging that is used to identify predefined entities, such as persons, places, companies, clinical trials, drug names, gene sequences, and proteins. The right level of granularity for your organization and content will depend on how you intend to use the tagging.

continued
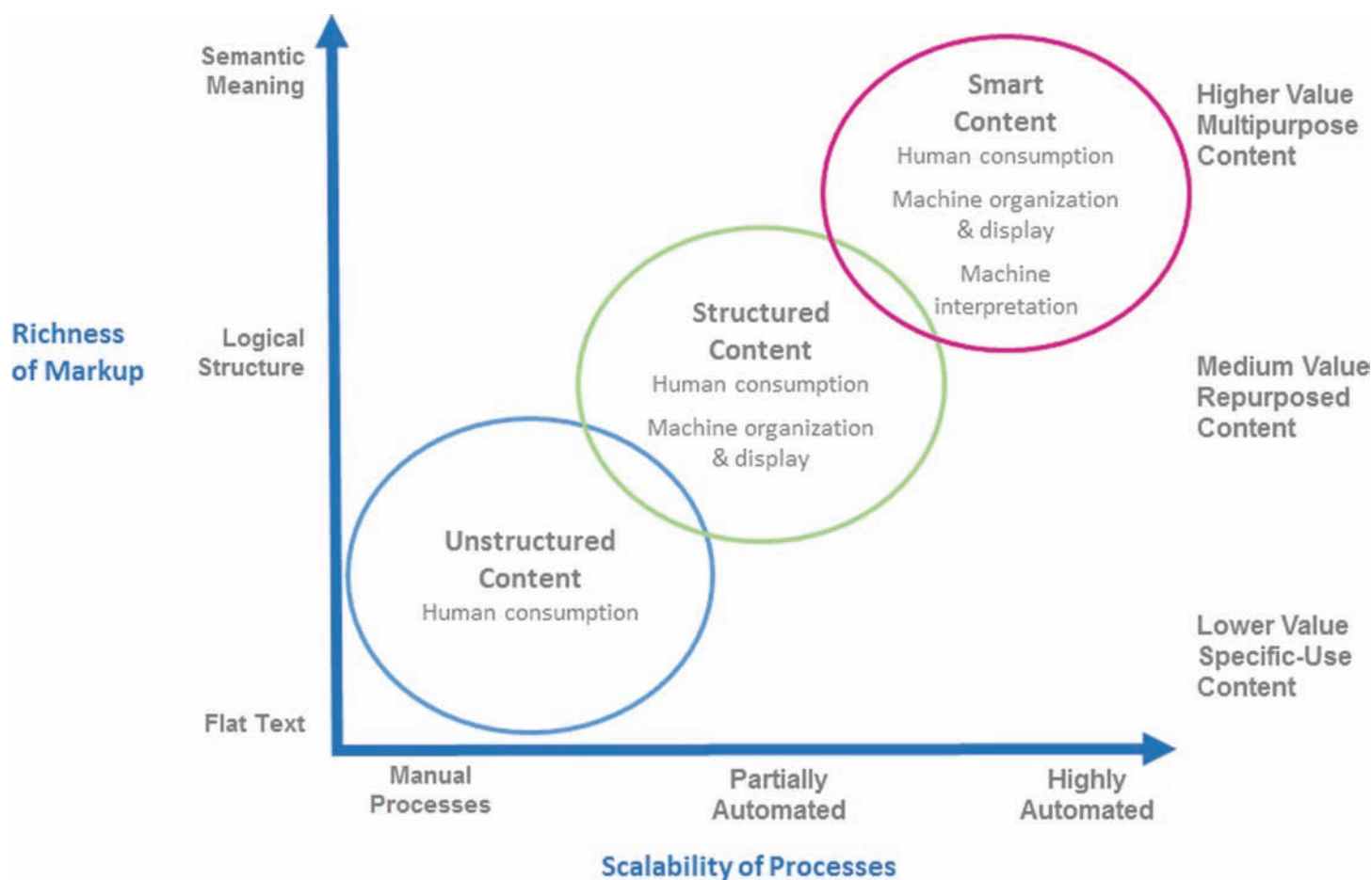
Fig. 1. The value of content increases as increasingly rich markup is added to it. Smart content, which includes semantic markup in additional to structural markup, can be acted on by applications in highly sophisticated and automated ways and to meet a broader array of business objectives.

From "Smart content in the enterprise: How next-generation XML applications deliver new value to multiple stakeholders." Published with permission. Copyright 2014 Outsell, Inc. *www.outsellinc.com.*

Who (or What) Tags?

Mechanisms for tagging content range from fully manual to fully automated.

In **manual tagging,** a person who has the appropriate expertise (sometimes called a subject-matter expert) reads the content and applies tags; this process is sometimes referred to as semantic indexing. Manual tagging is ideal when your intended use of tagging requires a high degree of precision, for example, in clinical applications such as clinical decision-support tools. But it can be cost prohibitive for large volumes of content because it is labor intensive and hard to scale to large volumes of work. Some content types, such as multimedia, are not amenable to automated systems, and manual tagging might be a better option.

In **automated tagging,** software analyzes content, adding tags on the basis of concept matching, statistical patterns, and linguistic analysis. Most automated systems include a "teaching" phase during which humans adjust the algorithms used for tagging to fit a specific data set and subject field and thereby increase the level of precision and accuracy that can be achieved through automation. Automated tagging is highly scalable and is good for finding trends in large bodies of content. It is sometimes the only option for very large content sets. However, automated approaches can lead to false positives (incorrect applications of a tag), missed concepts, and other inaccuracies.

Often, a **hybrid** approach is used—an automated process is followed by manual review and modification. For high-value, specialized uses (such as clinical decision-support tools that require "one best answer" results), this extra human touch may be necessary to achieve the right level of tagging accuracy.

Knowledge Organization Systems

Figure 2 shows the different knowledge organization systems that can be used for content classification and organization. They range in complexity from a simple controlled list of common terms to a highly complex ontology that describes relationships between terms. Such classification systems are the framework for the semantic layer and semantic tagging. They control normalization, consistency in tagging,

CONTROLLED VOCABULARY
Restricted list of terms

TAXONOMY
Controlled vocabulary organized into hierarchical structure (with parent-child relationships)

THESAURUS
Relationships in addition to parent-child, e.g., associative (related term), and equivalence (synonyms)

ONTOLOGY
Formal specification of the terms in a domain and the relations among them; the basic building blocks of ontologies are known as "triples": subject – predicate – object

INCREASING COMPLEXITY

Fig. 2. Increasing complexity of knowledge organization systems.

concept grouping and hierarchic relationships, and integrations and interoperability (both internal and external).

Industry Standard Knowledge Organization Systems

Your knowledge organization system must be able to interact with standards of your domain to forge useful external integrations. Many classification systems, usually in the form of taxonomies or thesauri, are in use in different scientific domains, such as the Unified Medical Language System (UMLS) and those from the American Chemical Society, American Institute of Physics, Association for Computing Machinery, Institute of Electrical and Electronics Engineers, Environmental Protection Agency, National Aeronautics and Space Administration, and US Geological Survey. Investigate what's available in your scientific domain; if there is a system that is a good fit for your content and your intended uses, consider adopting it. A good example of a domain-level knowledge organization system in medicine is the UMLS metathesaurus, which maps more than 100 health-care vocabularies—for example, Medical Subject Headings (MeSH), Systematized Nomenclature of Medicine (SNOMED), and the *International Classification of Diseases* (ICD)—to support health-care interoperability.

If you are lucky enough to have an appropriate taxonomy or other classification system that describes your domain, make sure that you have a mechanism to adapt it to meet the needs of your content and your users and the pace of change and new concepts in your field. For science publishers in cutting-edge fields, a standard taxonomy will be unlikely to be updated fast enough to match your research output; you'll need to be able to add concepts at the time of publication and reconcile them with the standard taxonomy later.

What Can Be Done with Semantically Enriched Content?

Once you have semantically enhanced your content, the benefits are many. A few are covered below.

Search and Discovery

Many publishers look to semantic enrichment to improve searching. Better search functionality makes users more productive, and this makes your content more useful to them. Time-strapped users are struggling with information overload, and fewer, better answers often are preferred. Your classification system should include equivalent relationships (also called non-preferred terms), terms that essentially refer to the same thing. They can be synonyms, abbreviations, jargon, even misspellings. The equivalents can be used in your search to normalize the constantly evolving variations in the language that authors use to describe concepts and that searchers use to find them, allowing, for example, searches for "a-fib" to retrieve content on atrial fibrillation. Search "autocomplete"

continued

can also direct users to content by filling in matching concepts that are found in your content set as a user starts to type into the search box.

Semantic metadata also help to find nontext objects, such as images and videos, which can be tricky to find with full-text search because they contain little or no text to match on.

Topic Groupings and Hierarchic Relationships

In addition to serving as the "concept control" for tagging, semantic tagging governed by a taxonomy also allows content to be grouped topically—for example, to create topic collections or virtual journals—as well as hierarchically. A taxonomic hierarchy can even be provided to users in an application to allow them to broaden or narrow their exploration.

Related-Content Linking

Semantic tagging is a good way to offer users pathways for serendipitous discovery of related content—stumbling on gems that are highly relevant but that the user didn't even know existed. Related-content linking allows a publisher to put additional relevant information in users' paths and entice them to read more content; this can improve such metrics as number of page views and time on site. These links are dynamically generated as new content is added; new or updated links do not need to be "hard coded" as content is added.

Hooks for Integration and Interoperability

Semantic tagging can also provide "hooks" that allow you to connect external sources to your content and to exchange information across applications automatically. A good example of semantic tagging to provide integration hooks is the National Guideline Clearinghouse (NGC). NGC creates structured summaries of clinical-practice guidelines and tags them with several health-care vocabularies, including *ICD*, MeSH, and SNOMED. This tagging enables external sources to connect to the guideline summary by using shared terms.

For example, electronic health record (EHR) vendors can automatically provide guideline summaries within an EHR by using SNOMED terms.

It is increasingly important for publishers to integrate content into customers' workflows to bring content to them *in context* as they do their daily work. Such customers might include clinicians at the point of care, researchers at the bench, or students preparing for an examination. Semantic tagging and domain standard classification systems can provide the hooks that allow your content to integrate with workflow applications.

Connecting Users and Content

Getting users to provide details of their interests when they register for site access is notoriously difficult. But as a user navigates content on semantically enabled sites, you can apply the tags on content visited to that user's profile, eventually creating a profile that identifies the user's interests. What topics is the user interested in? How are the user's interests changing? Such user profiles can be used to create personalized information services or perhaps to connect users to *communities of practice*, groups of people who share an interest and who come together through social interaction to learn from each other.

Targeted Advertising

In addition to articles and book chapters that can be related through semantic tagging, advertising can also be related. Publishers can charge more for contextually targeted ads—ads that are topically related to content—than for nontargeted ads. Advertisers are increasingly interested in targeting ads to *users* instead of an article, and this is possible for sites that create user profiles through semantic tagging. Ads that are targeted to user profiles can be shown to users wherever they travel through the site.

New Products

Semantic enrichment lets you find topically related content and then recombine it to create new products from content that

you already have. Such content recycling can lead to image collections, mashup and micro products that serve specialized audiences and fit specific workflows, and topically constructed objects, such as virtual journals, knowledge environments, coursepacks, and learning objects.

How to Get Started

What steps should you take to get started?

First, *don't* start with technology. The temptation often is to jump into an exploration of the various technologies available and invite vendors in for demos. Before you explore technology, determine how you and your users will make use of semantic enrichment.

Create User Stories

Focus your semantic-tagging strategy on *user stories*. A user story captures what the user wants to achieve—who wants the functionality and why it allows that user to achieve something *useful*. How do people want to *use* your content? What tasks are they trying to do when they use your product? What answers are they looking for? At what point in their workflow is your content used? What content sets does it make sense to connect, both internally within your organization and with other content in your field or even related fields?

Your *organization* is also an important user of your product. What user stories does the marketing department have? Editorial? Advertising? For example, your advertising department might want to be able to target advertisements to related articles.

Even if your audience members are all part of the same specialty or are all members of your association, they will have different needs that depend on the roles that they are filling. A clinician wants to know the best treatment for the patient who is about to be seen. A researcher wants to know everything about a subject of interest. A student wants to prepare for an examination. Their user stories—and their demands of your content—will be different. If you solve a need for your users, you are more likely to create value and create successful features and products.

continued

Measure Return on Investment

As with any investment in infrastructure, you need to consider the return on investment: Do the various benefits that accrue from semantic enrichment outweigh the costs? As is true of many enabling technologies, the return is not always straightforward. Just as in the case of an investment in an XML workflow, you will need to consider the various ways in which semantic enrichment will benefit your organization—increased content discovery and use through better search, browse, and related-content linking; the ability to create new topically related products efficiently; increased user satisfaction; and premium rates from advertisers for ad targeting, to name just a few.

Be sure to look outside the publishing department for opportunities to connect content and users. Look to your organization's overall digital strategy for clues. How can your semantic strategy support your organization's overall goals? If you work in a society or professional association, for example, does your association have plans to integrate the professional content published in your books and journals with additional content available at your .org Web site, perhaps by connecting journal articles to relevant live events or other education programs? If so, using semantic enrichment to connect professional content with society programs will not only increase exposure and use of content but will also help your society to meet member needs.

Which Technology?

How do you decide which semantic technology to deploy? Focus on determining whether the technology supports your user stories. Here are some questions to ask when evaluating technologies and vendors:

- Does it offer or integrate with a constantly evolving knowledge organization system (such as a taxonomy)? How will it continually update tagging of your content to reflect new and changing terms?
- Does it meet the accuracy threshold for your users and your content?
- Can it tag at an optimal depth—both the right level of granularity and the right summary level?
- How will it handle figures, tables, video, and other media?
- Can the structure of the tagging output be supported by your existing content systems, in particular your Web content platform but also your content-management system, association management systems, and enterprise search?

Semantic Strategy

Semantic enrichment has many benefits, but issues of cost, scalability, and accuracy all complicate the technology decisions that need to be made, and all add risk. A well thought-out semantic strategy will maximize your probability of success. To develop your semantic strategy, focus on answering these questions:

- What are your organization's user stories?
- What are the business benefits and the return on investment for your organization?
- What content do you need to tag, how is it delivered, and can the delivery systems and platforms use classification systems and tagging in a way that supports your user needs?
- What classification system will you use? Are standard taxonomies or thesauri available in your industry? What is your plan for keeping your classification system up to date?

continued (from page 39)

coinvestigators in an appendix or in the acknowledgments section with their contributions.

Neurology's criteria take a step toward increasing the transparency of author contributions in research studies. In the last few years, other groups have recognized the need for identifying author contributions to scientific papers as author numbers have increased and it has become harder to discern the quality of each listed author's contributions. A few journals, including *JAMA* and *Science*, now require authors to choose from a checklist of contributions. Some preliminary studies are under way to create a taxonomy of specific contributions to enable researchers to assign contributor roles.[5]

FundRef, a recent initiative of CrossRef, which is described in this issue of *Science Editor*, allows institutions to "identify major funders of their employees' schol-

arly output".[6] The ORCID registry of unique identifiers, also described in this issue, will allow institutions to better evaluate specific researchers' activity in scholarly efforts.[7] It is expected that those initiatives and development of better definitions of author contributions will lessen author disputes; improve the capturing of researchers' contributions from journals and other scholarly sources, such as data sets; and help funders to track research publications. For *Neurology*, the objective is transparency: to let readers know who contributed to the intellectual content of studies and the resulting manuscripts, which is an essential component of the highest quality of scientific reporting.

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Developing a Social-Media Strategy

Meghna Sachdev

Social media clearly are a permanent fixture in the changing media landscape. Writers, editors, and other communicators of science need to consider social media a legitimate and effective way of reaching an audience.

Social media, quite simply, make it possible to get your content in front of more people. Facebook alone has become a formidable traffic driver: Analytics firm SimpleReach says that Facebook drives more traffic to media sites than any other social-media platform, and analytics company Parse.ly ranks Facebook second overall as a source of traffic, behind only Google, which, admittedly, has a massive lead.

But Facebook obviously isn't the only player, and driving traffic isn't the only game. Social media also allow you to develop your brand and increase its visibility. They can be the easiest way to control your digital image and get your brand recognized. And of course, they are the key to reaching the growing numbers of people who consume media exclusively online.

The biggest stumbling block for many organizations is not accepting that social media can be an important part of their digital future but rather learning how to use them effectively. Businesses often jump on social-media bandwagons without knowing why they are there or what they are doing and then find social-media success elusive. The key to avoiding that fate is to articulate a coherent social-media strategy. There is no one-size-fits-all approach to social-media success. It pays to develop a strategy that is tailored to your needs and abilities.

To begin with, identify your *goals*. What are you trying to achieve? Do you want to increase traffic to your Web site or boost

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your brand visibility? Are you trying to build a strong social-media follower base? If so, why? Spelling out your end game will help you to focus your attention and figure out the best way to achieve your goals.

Once you have identified your goals, assess the *resources* that you have at your disposal. What are your organization's strengths? For example, do you publish freely accessible online content? Do you have access to interesting and shareable images? Are you in a position to curate news on a specific topic easily? Identifying your resources will allow you to choose a social-media platform that showcases your strengths. At the same time, you should clarify how much time and money, if any, you can invest to reach your goals. Do you have staff members who have the time and inclination to maintain social-media accounts? If your goals and resources are mismatched, one or the other must be adjusted.

Identifying your goals and resources will help you to choose the social-media platform that is best suited to your needs. A wide variety of platforms are available. Many share few traits other than simply being "social"—allowing people to connect with one another and share ideas and information online. It pays to familiarize yourself with most of the major social-media platforms and to keep an eye on emerging technologies. However, a good social-media strategy does not require maintaining a presence on as many platforms as possible but rather developing a presence that works for you and your brand. Don't spread yourself too thin: remember that it is far easier to build equity into one social-media platform than into five.

To choose the platform that is right for you, identify the **purpose and limitations** of each platform that you are considering using. What is each platform designed for? What advantages does it offer you? How is it limited? Match your goals and resources as closely as possible with the social-media platforms that you have just assessed. Choose the ones not only that are

best suited to give you what you want but that you have the resources to manage.

Suppose, for example, that you want to increase traffic to your site, your time is limited, you can't keep up with fast-paced platforms, and your budget is low. In that case, Facebook is probably your best bet. It won't require constant monitoring, it's a proven traffic driver, and you won't need a big budget to get good results.

Finally, and perhaps most important, define your **metrics of success**. What does success mean to you? How do you plan to measure it? Set clear targets for yourself, and monitor your progress consistently. Don't underestimate the value of analytics. One of the great things about social media is that they provide almost instantaneous feedback. Use that feedback: Identify what works for you and what doesn't, and modify your strategy accordingly.

Flexibility is an important part of social-media success. The social-media landscape is extremely dynamic: There are always new platforms, and the "rules" for established platforms change constantly. Posts that were popular on Facebook 2 years ago would not necessarily be popular today inasmuch as Facebook's algorithm has changed drastically. Those sorts of changes make social media exciting, but they also emphasize the need for a coherent strategy. Once you've established the goals that you're working toward and what resources you have to achieve them, it's much easier to respond quickly and to try different platforms and approaches to maximize your return on investment.

There is no magic recipe for social-media success. What works for one organization or entity won't necessarily work for another, and defining a successful social-media strategy can be confusing. However, clearly stating your goals, identifying your resources, assessing the purposes and limitations of individual social-media platforms, and defining your metrics of success will make it possible to choose an approach that you can manage and that will achieve what you desire.

Perspectives on Transitioning from Print to Online Only

Alaina Webster

We've heard the dire predictions that print is dying quickly, if it is not already dead. More and more information sources are "going digital", and scholarly journals are most certainly among them. Making the move from print publication to online only is daunting, and there are many factors to consider, from access and impact factor to revenue and reader preferences. However, in the age of the tablet, e-reader, and smartphone and with print costs rising, making a Web presence their only presence is something that many publications are debating.

Mountain Research and Development **Goes Online Only: A Case Study**

There may be many reasons why a publication makes the decision to move from print to online only. For *Mountain Research and Development* (*MRD*), which has been an online-only publication since 2009, the main reason was financial. However, the editors did want to consider reader preferences and they had a strong commitment to keeping *MRD* free of charge for readers in the Global South (the countries of Africa, Central and Latin America, and most of Asia, many of which are underdeveloped). "We polled *MRD*'s readership in 2006; about half (110) of our respondents (203) answered the following three questions about whether they wished to see *MRD* in a format other than print only and whether they were prepared to pay for the additional offer," said Anne Zimmerman, one of two associate editors of the journal. When results were tallied, 20% of respondents said that they would agree to pay for an electronic, online-only format; 13.6 % would agree to a fee for individual articles on a pay-per-view basis; and 65.5%

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felt that free access to individual articles would be the best option.

"We interpreted those percentages as a very low willingness among readers to pay for electronic access and a fairly high willingness to see *MRD* open access," said Zimmerman. "Because only about half the respondents answered those questions, however, it was not possible to interpret the 65.5% 'yes to open access' as a decisive yes to a shift from a print to an online-only version." Moreover, the paid model of online-only access did not seem in keeping with *MRD*'s commitment to keeping content free of charge for the Global South. Readers in the Global North who were willing to pay for online access would already do so using BioOne or JSTOR, but *MRD* was concerned about cutting off access for those in the South who could not afford access. "We knew that institutions in the South—and readers in the South in general—would generally not be able to access *MRD* online if they had to pay for access. Access to *MRD* in the Global South was (and still is) an essential element of *MRD*'s mission, and we assumed that many readers would not have Internet access, so we decided not to explore further the possibility of going online only at the time," said Zimmerman.

Then, in 2008, the journal's main donor funds were cut drastically, and *MRD* was forced to find a new business model. It was no longer possible to afford the printing and mailing costs for the journal, and the choice was made to switch to online-only publication. Still, *MRD* wanted to maintain its policy of free access for the Global South, so the editors decided to make the journal open access and recoup some of the publishing costs via a publication fee.

MRD's editorial board was not consulted before the decision was reached, but the staff did speak with the International Mountain Society, which holds the journal's copyright. After all members had agreed to the

new business model, *MRD* began working with Allen Press and BioOne to make the transition from print to online only. The first online-only, open-access issue of *MRD* was published in February 2009. "Readers seem to have accepted the move to online only and are grateful to be able to access articles free of charge. Our impact factor has increased, and we are generally satisfied with the new model," Zimmerman said.

When asked whether she had any warnings or advice for other publications that were considering a similar move, Zimmerman said that "it is definitely worth while to compare offers from different places and take time to assess all the implications of going online only and not only the financial ones—what we always kept in mind as we were designing our new business model was *MRD*'s mission (*www.mrd-journal.org/about.asp*). The mission proved to be essential in guiding our decisions. It was also important to consult the International Mountain Society; luckily, it agreed with our proposal, and we did not have to make major changes in our proposed business model." She went on to say that working with "professional partners" was a benefit, and she would caution against self-publishing with journal-production software, even if it is available free. "We have been very satisfied with our investment in support from publishing partners, such as Allen Press, and the online solutions that they offer. Staying with BioOne has also been useful in our eyes because it keeps *MRD* among a series of journals of high renown. Generally speaking, we think we have benefited from staying with these professional partners rather than going for a 'homemade' solution," she said.

Considering the Transition

In moving away from print, there are several factors to consider. First, and often most important, is the financial aspect of

publication: Will moving to an online-only platform save the journal money without sacrificing quality or content? Print is expensive, but print subscriptions are often the main source of revenue for a journal. Without the physical product to sell to readers, how will revenue be earned? Journals need to consider submission fees, page charges, charges for site access, or a pay-per-view system for site content to close the gap. Crunching the numbers and gaining a clear picture of the financial aspects of a journal both in print and as an electronic resource are important.

If the numbers support a move in theory, it might be time to gauge the reaction of authors and readership. Are authors willing to pay a submission fee or page charges? Are readers interested in electronic content or would they be happier with a print product? (The latter will be especially important in considering whether to charge for access to the site.) A survey of current authors and subscribers, either through e-mail or by mailing a hard-copy questionnaire, can provide a clearer picture of their interest in such a transition. For more information on creating and distributing a successful survey, see *http://allenpress.com/system/files/pdfs/library/presentations/Nick_Dormer_APWEB19_2012.pdf.*

Some other factors to consider:
- Print is less flexible (corrections cannot be made in articles), and color is more expensive.

- Online only may not be as accessible or user friendly for some regions of the world or for some portions of the reader population.
- Will the new online-only platform be open access? If not, would access be limited by subscriber passwords? By pay-per-view fees?
- How will moving away from print affect the impact factor?
- Will previous or "legacy" content be archived on the site? If so, how many issues? How long will such a project take and what will it cost?

A Vendor's Perspective: Allen Press

Once a journal has reached the decision to move to online only, it is important to discuss and create a timeline for the transition with a vendor, assuming that self-publication is not being considered. Establish a date for the official launch of the first online-only issue and a deadline for supplying all content to be included. If archived or legacy content will be available online at the moment of launch, time will need to be built into the schedule to convert this content from print to an electronic medium. Cost and readers' preferences may determine the look and feel of any legacy content: Some journals simply provide scanned copies of old articles on their Web sites, and others have all content rekeyed and formatted for the Web. The look and feel of legacy content may be an item to address in a survey of readers and authors.

According to Christina Berger, at Allen Press, there is no set process for moving a journal; the process varies from publication to publication. To her, the most crucial part of the transition is notifying readers of the move well in advance and making sure that they have the information and support necessary to access the content in its new form when the switch is complete. That may be especially important if viewers will need passwords or access codes for the site; the editorial office or the vendor will need to ensure that people are available to field questions and troubleshoot problems in a timely manner. Often, journals announce the migration to an online-only format with an editorial in the print journal. If your journal already has a Web site, as many do, an announcement on the homepage can be helpful. It is necessary for readers to know the date of the first online-only issue and the method for accessing new content after this date, but many may also wish to read about the reasons behind the decision to change.

Given the current economic situation and technology-driven climate, many organizations are considering online-only publication. It is important to weigh all the options and decide what format best fits the journal, both from a financial standpoint and from the standpoint of meeting the needs of readers and authors. Work with publication staff and vendors to determine the best way to meet the needs of the journal and the best platform for achieving the publication's goals. 🖋

Calling All Photographers

Do you have original photographs that pertain to areas of science, medicine, or publication? Submit them to Patricia K Baskin at *pkbaskin@gmail.com* for consideration as a *Science Editor* cover image.

ORCID Picks Up Steam

Angela Cochran

Since the Open Researcher and Contributor Identifier (ORCID) registry of unique researcher identifiers was launched a year ago, more than 362,000 new ORCID iDs have been created. More than 1.3 million DOIs have been connected to ORCID accounts. On 30 October 2013, representatives of publishers, funding agencies, and societies gathered in Washington, DC, to collaborate on ways in which the three unique sectors can use ORCID iDs effectively.

The key to effective ORCID implementation is not only for publishers to incorporate iDs into their publishing management systems but for funders and universities to integrate ORCID iDs into their workflows, making them the identifications of choice, explained Laurie Haak, executive director at ORCID.

Several international consortia are recommending to their governments that ORCID become the official registry for researchers throughout their countries.

Users can see ORCID iDs starting to become established. PubMed now incorporates ORCID and allows users to search by ORCID iD. The Nature Publishing Group and Hindawi Publishing have integrated ORCID iDs and are now depositing ORCID data with metadata deposits to CrossRef. These systems facilitate the inclusion of new papers in a person's ORCID profile in an automatic way.

Through microgrants funded by the Alfred P. Sloan Foundation, several universities and societies are also implement-

Angela Cochran *is director of journals at the American Society of Civil Engineers, Reston, Virginia. She is a volunteer ambassador for ORCID.*

A panel discussion explored how ORCID is being implemented. Pictured are Véronique Kiermer, executive editor and head of researcher services, Nature Publishing Group; Christine W. McEntee, executive director and chief executive officer, American Geophysical Union; Amy Northcutt, chief information officer, National Science Foundation; and John Vaughn, executive vice president, Association of American Universities.

ing ORCID. The Society for Neuroscience and the American Geophysical Union are planning to use ORCID to identify society members in all their databases.

Harvard University, Boston University, the Chalmers University of Technology, the University of Michigan, and numerous other universities and research institutions are integrating ORCID into a multitude of campus systems, including faculty profile systems, institutional repositories, and human-resources systems.

Funders are also integrating and requiring ORCID iDs as part of their grant-proposal systems. The Wellcome Trust, the National Institutes of Health, and the US Department of Energy have incorporated ORCID into some of their systems, and researchers can expect to see requests for

their ORCID iDs when they apply for grants in the future.

Rebecca Bryant, director of community outreach at ORCID, spoke of a robust ambassador program. Fifty-one ambassadors from 22 countries are blogging, tweeting, meeting with their colleagues, and presenting posters at conferences to spread the word about ORCID.

ORCID is still in the early stages of development, and clearly there is no shortage of ideas on how to use ORCID iDs in multiple scenarios. While stakeholders are conjuring up the best uses, ORCID continues to make the ORCID registry site more robust. The site is available in five languages, and a mobile version will be released soon. For more information about ORCID iDs, visit *www.ORCID.org.*

CLOCKSS: Preservation of Online Publications

Kim Smiley

A library that purchases a print subscription can manage and preserve the collection in its institution. But as more and more publishers are transitioning to an e-format, preservation of online publications is increasingly important. Libraries want to be assured that their institutions will have permanent access to the online publications that they have subscribed to or purchased.

A solution to the problem is a third-party archive, independent of the publisher, that can reach subscribers and library patrons if the publisher ceases publishing, goes out of business, or experiences a disruption in service for a long period. Even publishers that are already preserving content or have an internal contingency plan are wise to consider an added level of protection. If a publisher needs to shut down, having this additional level of protection would prevent system-management issues.

CLOCKSS (Controlled Lots of Copies Keep Stuff Safe) is one such permanent archive. A not-for-profit "dark archive" founded by the world's leading libraries and publishers, it ensures the long-term preservation of online scholarly content.

CLOCKSS uses the award-winning LOCKSS (Lots of Copies Keep Stuff Safe) technology developed at Stanford University. LOCKSS enables librarians to preserve their electronic collections at the institutional level, providing perpetual access for the library.

KIM SMILEY *is director of publisher relations for the CLOCKSS Archive.*

CLOCKSS goes a step further by ensuring the long-term survival of digital scholarly publications for the entire world's benefit. The technology preserves the content in the form in which it was originally published online and includes the publishers' branding. Preservation in the original form ensures that the integrity of today's content will remain unchanged and readable by tomorrow's scholars. It also avoids errors that can occur when content is normalized.

Content in the archive is preserved and decentralized in a network of 12 geographically and geopolitically disparate nodes that span the globe. The nodes are in Australia, Canada, Germany, Hong Kong, Italy, Japan, Scotland, and five places in the United States.

CLOCKSS is a closed network that does not provide access, so it is a truly dark archive, and this ensures the security of the content. The archive's multiple copies improve reliability and safeguard against natural disaster or political instability. The nodes are exact copies of each other and check each other for data integrity. The copies are a brilliant feature to have in case, for example, inclement weather at one of the locations causes a node to go down. If that occurs, 11 copies in the network can bring the 12th location back up to speed in short order.

The archive is governed by a 24-member Board of Directors that is drawn from participating publishers and supporting libraries and makes CLOCKSS a community-governed archive. The Board consists of representatives of 12 publishers and 12 libraries, all having equal say in deciding procedures and overseeing the preservation of e-journals, e-books, and data sets of a rapidly increasing list of participating publishers. It is an exceptional mix of decision makers, and many publishers find comfort in knowing that half the caretakers of the archive are also owners of content that is preserved in the archive.

Before releasing (triggering) content from the archive, the CLOCKSS staff works with the publisher in question to make certain that publication rights have not been transferred to another publisher or reverted to the author. The staff checks with the major aggregators to ensure that the content is not earning royalties for the rights holder. CLOCKSS does not want to provide access to a publication if it is already available, nor does it wish to interfere with a rights holder's business model. CLOCKSS's goal is to be the source of last resort.

When CLOCKSS is satisfied that the content is truly orphaned, it asks the Board for a decision to trigger content. Released content is free to everyone and made available under a Creative Commons License. Two locations that participate on the Board—EDINA, a data center at the University of Edinburgh, and Stanford University—are making triggered copies available on their servers, but anyone may host triggered copies. Triggered copies can be viewed at the following URL: *www.clockss.org/clockss/Triggered_Content*.

Publishers that would like to preserve content or libraries that would like to support the CLOCKSS archive may contact *Randy.Kiefer@clockss.org* or *pub-director@clockss.org* or access *info@clockss.org*.

SocialCite: A New Service Designed to Help Experts Improve the Literature

Kent Anderson

Citation is a powerful form of social communication that is largely unmanaged. Reference lists have more than quadrupled in length since the 1970s, but there have been few important advances in how citations are used or generally understood. The impact factor shows fractional quantitative relationships. Citations can be used to create unfounded authority by expanding modest claims through a series of distortions. They can be critical of the source, which currently still counts as a positive intellectual debt in impact-factor calculations. They can point to low-quality evidence, but this is difficult to detect in time-compressed situations or busy editorial offices.

Because citations are slippery, scholars, researchers, and academics read the literature with caution. Editors have no useful tools for evaluating the quality of the reference lists in papers that they receive. And once a citation takes hold in the literature, there is little to stop it from being increasingly distorted with reuse.

In short, citations need help, editors need help, and readers need a tool that makes it easy for them to discern inadequate or commendable citation practices.

SocialCite is being introduced to begin to address those fundamental issues in a way that is compatible with normal workflows and current technologies.

Using a simple Javascript widget that is easily inserted into online reference lists, SocialCite gives readers of the literature a two-click method for evaluating citations as a natural part of their reading workflow. If readers wish, they can also mark the type of citation that they encounter—whether the citation critiques the source, cites assertions, cites evidence, or cites authority.

KENT ANDERSON *is the founder of Caldera Information Solutions, LLC, and SocialCite.*

There are long lists of the qualities that citations can possess, but SocialCite boils it down to two major dimensions: Is the citation "appropriate"? Does the citation point to "strong evidence"? SocialCite can limit its vocabulary in this way because it has been designed as a network tool. Most citations exist in multiple settings, in multiple journals, and in at least a small family of disciplines. If signals from throughout the literature are concatenated, millions of data points are possible, and this can create a useful and powerful statistical mesh that can be analyzed to derive a number of new and useful measurements.

The data are even more robust because there are two sides to any citation: the citing article, author, and journal and the cited article, author, and journal.

The "appropriateness" measure refers mostly to the act of citing; that is, is the citation a good-faith citation, accurate, and free of distortion or expansion? Some articles become common sources of distortion, passing a critical threshold from evidence into belief. SocialCite's goals are to detect when that occurs and to limit the damage. False hubs of authority can form around such citation echo chambers. SocialCite seeks to weed these out before years of misdirected research questions emanate from a distorted authority hub. To that end, SocialCite will create a Care Index that shows which journals, authors, and papers have the highest rankings of care in what they cite and in how they are cited.

The "strong-evidence" dimension focuses more on the cited work: Does the article being cited provide high-quality evidence? Too often, cited sources are underpowered or flawed in some manner or simply provide overviews of other evidence while providing no new evidence. A paper may receive many ratings across citing sources as being of high quality or low quality when SocialCite is in place. SocialCite will create a Quality Index that shows which journals, authors, and papers cite the best evidence or are the sources of the best evidence.

Testing with more than two dozen scientific researchers and editors revealed a strong awareness of the problem that SocialCite seeks to address. In addition, reference lists are consistently used as part of the reading process, and the absence of a feedback tool around this major intellectual activity was viewed as a major deficiency in the current design of online journals. Finally, all agreed that two or three clicks would pose no barrier to use of SocialCite.

To encourage its use, SocialCite will offer all participants a free dashboard in addition to immediate feedback for any interaction. The personal dashboard for individual users will keep track of rated citations and provide summary data on journals that they routinely use. The dashboard for publishers will flag problematic citations in their journals and present summary data on all their titles.

Publishers will benefit from the increased use of their HTML pages and by the message that participation in SocialCite sends to researchers and readers: We care about quality, we understand that you use citations, and we have a technology that benefits your core activities.

We are also imagining an editorial tool once SocialCite's data are robust enough to make strong inferences about journals and papers. Our vision is of a preflight tool for manuscripts at any stage in the review process. The tool would flag citations that are potentially problematic because they are being used inappropriately across multiple sources or because they are pointing to evidence that is being consistently rated as of low quality. The tool will only flag potential problems and recommend paying extra editorial attention. In addition, we are hoping to develop a tool that would flag authors who are routinely associated

with papers that are distorting citations or publishing papers regarded as of low quality.

SocialCite's potential is important, but its success depends on one crucial aspect: the network effect. It has to be installed in a large number of journals if it is to generate robust, reliable data among disciplines. That is why our business model will have no costs to publishers who want to install it (other than work that a platform provider might do to install the widgets). On the basis of our user research, we believe that the widget will increase engagement with publisher sites, especially their HTML. SocialCite was such a draw that when users were asked how they would rate a citation in a printed PDF, many said that they would go back to a SocialCite-enabled paper and rate citations that caught their attention.

Social media are changing the world. News stories trend on Twitter and Facebook. Political and athletic careers are bolstered or torpedoed by social media's power and transparency. Science is advancing through social-media initiatives like Zooniverse. It is time for the power of social media to come to the evidence base of science by allowing scientists to indicate the quality and appropriateness of citations in the literature that they rely on. SocialCite has the potential to match the increased velocity and quantity of publication with increased quality and interactivity.

If you would like to be an early adopter or simply learn more, visit us at *www.socialcite.org* for more information and to register for your free account.

Spotlight on Marketing Committee

A new CSE Marketing Committee was established in February 2014 under the leadership of Byron Laws and Jennifer Deyton. The Marketing Committee aims to increase the visibility of CSE and scientific editing throughout the scientific publishing community and the general public by developing and executing marketing strategies to promote CSE educational programs and events, driving registration for CSE events, and reinforcing CSE's identity as a respected advisory body and authoritative resource for publishers, researchers, authors, and editors.

Asking for Trouble: Submit questions or problems to "Solution Corner"!

One of the features of *Science Editor* is "Solution Corner", a column that explores problems and challenges that our members deal with in their jobs, be they technical, managerial, or other issues in the STM publishing realm. This column needs your input! If you submit a question that is general enough to be relevant to many of our members to *solutioncorner@ametsoc.org*, we will run it by two or three professionals in the field; your question and their responses will be printed in *Science Editor*. We look forward to your submissions!

What Editors Need to Know about CrossRef in 2014: Service Offerings Benefit Many Parties in the Scholarly Communication Process

Rachael Lammey

In 2014, CrossRef celebrates its 15th anniversary. Begun in 1999 to create a consistent reference-linking infrastructure in online scholarly literature, CrossRef has developed into an association of academic and scholarly publishers offering a variety of services to participating organizations with the aim of improving scholarly communication.

When most people think about CrossRef, they think about the Digital Object Identifier (DOI), an International Organization for Standardization standard for creating consistent URLs. CrossRef is the largest DOI registration agency, and initiatives surrounding the DOI and associated article metadata are still at the core of what CrossRef does. However, as CrossRef has grown as an organization, it has diversified to offer a number of services to respond to its members' needs. This article will describe several of those services, from such new initiatives as the FundRef funding-information service and text-mining and data-mining tools to such established services as CrossMark update identification, CrossCheck duplicate screening, and reference linking, which are showing healthy growth.

FundRef: Measuring the Outcomes of Research Funding

FundRef went live in May 2013 and provides a standard way to report funding sources for published scholarly research. Why is it needed? The lack of standardization in funding-body names and metadata has made analyzing or mining research-

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funding information from scholarly publications difficult. Different publishers display funding information in different locations in text fields, such as acknowledgments sections and footnotes. Funder names are not standardized: They may be abbreviations or be acknowledged at different levels in the organizational hierarchy. Those practices mean that funding bodies cannot easily track the output of their expenditures, publishers cannot easily identify the major funders of the research that they publish, research institutions cannot easily identify major funders of their employees' scholarly output, and transparency to the public about public funding and its results is lacking.

CrossRef maintains a standard taxonomy called the FundRef Registry, which is a master list of more than 4000 standard funder names from all over the world. The taxonomy was donated by Elsevier and is freely available to anyone via the Creative Commons Public Domain (CC0) license. Scholarly publishers can incorporate the registry into their submission systems. Publishers ask authors, at submission, to choose the name or names of the funding bodies from this master list and to submit accompanying grant numbers. CrossRef has also made tools available for publishers to tag backfile content with FundRef information retroactively. Publishers' production systems store this funding information so that publishers can now submit standard FundRef metadata with the bibliographic metadata that they already send to CrossRef to assign DOIs. They may also add FundRef data after the initial bibliographic metadata have been submitted.

Once the FundRef metadata are in the CrossRef database, they are searchable, either through CrossRef's search interfaces, via an Application Programming Interface (API), or in third-party tools that incorporate CrossRef metadata. Publishers, funders, and other interested parties can query by funder name or grant number to discover the resulting publications. They can also look up a piece of content by using other metadata (such as author, title, or CrossRef DOI) and find out the funding sources. FundRef Search (*http://search. crossref.org/fundref*) is CrossRef's free Web tool for looking up funding bodies and finding papers that have resulted from their grants. Publishers are also able to display FundRef information in a standard way. For publishers that are participating in the CrossMark service, FundRef data will automatically appear in the Publication Record tab of the CrossMark dialog box.

At the time of writing, 29 publishers have signed up for FundRef, including BioMed Central, IEEE, Hindawi Publishing Corporation, Oxford University Press (OUP), SciELO, and Wiley. A full list can be found on the CrossRef Web site: *www.crossref.org/fundref/index.html*. More than 47,500 CrossRef DOIs with FundRef metadata are available, and the number is growing rapidly. FundRef has garnered a good deal of attention with funding bodies and publishers alike, and CrossRef has committed to working with the funding, publishing, and library communities to make the data useful and widely available.

CrossRef Metadata Search

With the collection of bibliographic metadata through CrossRef DOI deposits, funding information through FundRef, and other publication record information through CrossMark, the CrossRef database is a growing source of useful metadata. As mentioned, FundRef Search lets researchers, agencies, publishers, and the general public look up publications by funder.

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Another useful, free public search tool is CrossRef Metadata Search (search.crossref.org), which allows anyone to search for any publication metadata stored in CrossRef's database. It is a simple way to search for a particular CrossRef DOI or ShortDOI (*shortDOI.org*[1]) or for articles in a particular journal via the journal's ISSN, and it also shows funder information (if available) and links to any patents that cite a particular CrossRef DOI.

CrossRef's metadata database represents more than 64 million CrossRef DOI records from journal articles, conference papers, books and book chapters, data sets, and components of articles, such as tables and figures. CrossRef Metadata Search supports searching by standard bibliographic metadata (author, title, and publication). It also allows users to search by Open Researcher and Contributor Identifier (ORCID). It provides a way to refine searches on the basis of publication year and other criteria. CrossRef Metadata Search also allows users to generate formatted citations from search results.

More technical users can output CrossRef Metadata Search results in ContextObjects in Spans for import into Zotero and other document-management tools. A free API is also available so that users can integrate results into their own applications. Basic OpenSearch support is available so that CrossRef Metadata Search can be added to a browser search bar.

CrossRef Support for Text-Mining and Data-Mining Research

Another service to support researchers and publishers coming in 2014 is support for text mining and data mining. CrossRef has been running a pilot (called CrossRef Prospect) to simplify the technical and legal interactions between researchers and publishers to facilitate the growing interest in text mining and data mining of scholarly content.

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1 The shortDOI Service creates shortened DOI names, of the form 10/abcde, as aliases for existing DOI names, which are often long strings.

CrossRef will provide two complementary tools. First and most important, a common API will be available to direct researchers to the full text—the version appropriate for mining—of content, identified by CrossRef DOIs, among publisher sites. CrossRef is not providing the discovery tools but rather a directory of where the minable content lives on participating publishers' sites. Second, publishers whose standard licenses do not allow text mining and data mining can make use of a license registry, a central library of terms and conditions. Participating CrossRef Member publishers can upload supplementary "click-through" agreements for researchers to agree to before proceeding to mine content.

Together, those tools will allow researchers to harvest content for text-mining and data-mining analysis easily by using a standard API throughout all publishers' content. CrossRef does not provide access controls for this content; for researchers to take advantage of the tools, they must already have access, whether through subscription or through open access by the publisher. The tools build on well-defined Web standards and best practices, such as the DOI and content negotiation.

Growing Number of CrossMark Participants Allows Researchers to Identify Changes and Get Valuable Publication-Record Information

CrossRef has also seen growth and development in its existing services. For example, more than 25 CrossRef member publishers now participate in the CrossMark update identification service. Participants include the BMJ Journals, Cambridge University Press, Elsevier, F1000 Research, The Royal Society, and Wiley. A complete list of participating publishers is available at *crossref.org/crossmark/AboutParticipatingPubs*.htm. More than 300,000 CrossRef records include CrossMark metadata; over 3,000 indicate that content has been updated since publication.

Before CrossMark, researchers had no way to tell when important changes had

occurred in an article or other scholarly document that they may have downloaded months earlier. Now by simply clicking a single, recognizable logo, any reader can have access to a status update from the PDF of the HTML version of the article.

Clicking on the CrossMark logo on a scholarly document launches a pop-up box that provides status information, for example, that the document is up to date or that it has a correction, update, retraction, or other change that could affect the interpretation or crediting of the work. The CrossMark Status Tab also provides a permanent link, via the CrossRef DOI, to the publisher-maintained version of the content and an update, if one exists.

Another important function that the CrossMark service provides is displaying additional (optional) publication-record information in a standard way. In addition to the Status tab, a CrossMark pop-up dialog box may also contain a Record Tab. In addition to displaying FundRef information as previously mentioned, publication-record information can include publication dates, links to supplementary data, ORCIDs, or rights information.

CrossRef member publishers participating in CrossMark have added more than a million items of additional metadata. CrossRef calls those pieces of nonbibliographic metadata *assertions*. All the information is available through CrossRef's free APIs, and it is also available to third-party recipients of CrossRef metadata so that they may display CrossMark updates and information to their users. Utopia Docs, Inera eXtyles, and Microsoft Academic Search have already integrated CrossMark into their products, and CrossRef has plans to incorporate CrossMark metadata into its own tools, including CrossRef Metadata Search.

CrossCheck: Helping Publishers to Detect Manuscript Similarity to Published Works

The CrossCheck duplicate-detection service, powered by iThenticate, is in its sixth year of operation and has more than 500 member publishers. Recent adopters include the American Chemical

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Society, the Institution of Engineering and Technology, and the Royal Society of Chemistry. Use is growing; member publishers uploaded more than 100,000 documents to iThenticate for checking in each of the months of August, October, and November 2013. CrossRef expects use to continue to grow as new members integrate the service into their peer-review processes and manuscript-tracking systems improve their workflow integrations for CrossCheck.

Regular CrossCheck users have benefited from a number of recent improvements in the iThenticate document-screening system. The major change has been the release of the Document Viewer, which presents documents uploaded to the system in their original format. It helps users to interpret the reports by allowing them to see clearly the section where the matched text sits in the document and thus to establish the context of the match. Other new features include section exclusion (the ability to exclude materials and methods and abstracts from the reports), small-match exclusion, and a file-size increase from 20 MB to 40 MB, which allows users to upload larger files to be checked. For more information on those features, see *www.ithenticate.com/products/whats-new*.

Expanding Membership, Impact, and Constituencies

CrossRef membership is growing at a record pace, with 4777 participating publishers and societies in 76 countries, 2038 participating libraries, and many affiliates. CrossRef remains the largest registration agency for DOIs, with 64,459,767 CrossRef DOIs—not just for articles from 33,000 journals but for additional content types, such as 7 million books, book chapters, and reference entries and more than a million data sets. In fact, CrossRef DOIs for data sets and book content are the fastest-growing types. Other scholarly document types with CrossRef DOIs include conference proceedings, papers, reports, theses, and components, such as figures and tables. Our members have benefited from nearly 85 million DOI resolutions (end-user clicks) in November 2013.

CrossRef staff actively engage in the industry by attending and presenting at conferences (such as CSE annual meetings) around the world—Antarctica, Asia, Europe, and North and South America. More than 150 people attended the CrossRef annual meeting in Cambridge, Massachusetts, in November, and several hundred more viewed a live stream of the event.

CrossRef continues to grow and innovate to benefit ever-expanding constituencies in the scholarly research community. Yes, CrossRef provides services to its scholarly publishing members that drive traffic to their sites, increase the discoverability of their content, and help them to improve its quality by identifying possible cases of plagiarism and by alerting readers to important changes. But there are many other beneficiaries. CrossRef's search tools serve researchers and the public, and FundRef benefits funding organizations and institutions. Text-mining and data-mining services reduce transaction costs for both researchers and publishers. CrossRef continues to engage with a wider group of stakeholders than ever before, increasing discoverability, convenience, and evaluation criteria and providing quality tools for scholarly publications.

Sample Correspondence for an Editorial Office

The CSE Editorial Policy Committee, in collaboration with the Committee on Publication Ethics (COPE), has developed sample correspondence that relates to specific situations that journal editors may face. Readers may copy and modify these drafts to fit their own needs. Suggested letters may be accessed at *www.councilscienceeditors.org/resource-library/editorial-policies/sample-correspondence-for-an-editorial-office/*.

Postpublication Peer Review in Plant Science

Jaime A Teixeira da Silva

The literature and blogosphere are alive with activity related to fraud and misconduct in science.[1] One notable case in plant science is that of a South Korean plant organic chemist, Hyung-In Moon, who faked e-mail addresses so that he could review his own studies; this led to 31 (and possibly more) retracted papers (*http://retractionwatch. com/2012/08/30/20-more-retractions-for-scien tist-who-made-up-email-addresses-so-he-could-review-his-own-papers/*). If one follows the increase in retractions (*www.retractionwatch. com*) as a result of poor research conduct or lack of ethics—such as duplication, plagiarism, and data falsification—it becomes apparent that there are still relatively few retractions in plant science. That begs the question, "Is this because there is less fraud and scientific misconduct in plant science or because poor science and misconduct in this field are underreported?" Fanelli[2] considered the growing number of retractions to be a good sign in that it reflects an increase in academic integrity and awareness rather than an increase in academic misconduct.

Beall's list of possible or probable predatory open-access (OA) publishers (*www. scholarlyoa.com*) highlights the risks caused by the explosion in OA publishing. Beall estimates that about 25% of OA journals listed on the Directory of Open Access Journals (*www.doaj.org*) are "predatory" and states that there has been a 20-fold spike in the number of predatory publishers or stand-alone OA journals in 3 years (*http:// scholarlyoa.com/2014/01/02/list-of-predatory-publishers-2014/*). Predatory publishing spurred the development of a system to quantify predation, the Predatory Score,[3] but this system does not result in a tangible solution. Sting operations[4] may raise awareness, through anger and revolt or through deception and fake submissions, but they also cast doubt on the purpose of the entity conducting such stings and may

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worsen the increasingly adverse perception of (and attack on) science (by society and skeptics).[5] Despite the increase in awareness, a stigma is still attached to using the word *fraud*, most likely because of the legal ramifications of its use, particularly the need to prove intent. Increasing the number of reviewers or making the peer-review process double blind still rely on a tiny, controlled sample of preselected peers, although such actions can improve the transparency of the process and reduce the level of risk.

A published paper is the culmination of a string of events that is based on the honesty and scientific integrity of four key elements that make up the publishing chain: authors, editors or editors-in-chief (EICs), peer reviewers, and publisher. A break in any of the chain's links will weaken and corrupt the published paper. Retractions provide a window into the weaknesses of that chain. Because honesty and integrity can no longer be taken for granted in the publishing process and because it is difficult to confirm authorship, the lack of a conflict of interest (COI), or the lack of data or image fraud and manipulation even during the process of peer review, a mechanism—in addition to peer review—to detect such problems is urgently required after publication.

How does one go about correcting the literature, rectifying the errors that were introduced by editors or peers because of a lack of stringent quality-control (QC) mechanisms or slack peer review, or ensuring the removal of fraudulent papers? Postpublication peer review (PPPR) has emerged as a realistic solution. PPPR will no doubt be a voluntary service initially as awareness among conscientious plant scientists increases. However, it could become an integral part of the publishing process with greater acceptance by EICs. Ideally, in the new model, publishers would allow reports of PPPR to appear alongside published papers after scrutiny and editing. That would allow continuing debate and discussion among academics about the quality of a paper even years or decades after it has been published. Poor peer review, poor editorial oversight, and lack of scientific rigor

reflect to some extent a lack of QC and of oversight by EICs, editors, peer reviewers, and publishers. There may be little or no appetite in those four parties for embracing PPPR, inasmuch as it would constitute recognition of personal or professional weaknesses, breaks in the QC chain leading up to the publication of a paper. How can PPPR be effectively conducted if such elements resist factual claims and analyses made in PPPR reports? One possible way is through anonymity, although a stigma is still associated with anonymity, as revealed by Yong and colleagues[6] and even by Elsevier's vice president, Tom Reller (*http://www.elsevier. com/connect/its-not-that-clare-francis-is-a-pseudonym-its-that-the-pseudonym-is-clare-francis*), who originally classified revelations by an anonymous whistle-blower (Clare Francis) as "unsettling" and "disruptive". Anonymous reports are more likely to be ignored or not taken seriously than those made by named scientists.

The issue of anonymity aside, PPPR is an important way to find errors, detect scientific fraud, and examine other concerns that undermine the integrity of plant-science publishing and thus the validity of published data. A PPPR report allows an open-ended discussion among peers and thereby seeks to perfect scientific concepts that may have been unclear at the time of publication. A PPPR report would probably result in the publication of a correction. When a PPPR report is filed with a journal, the editor and publisher are responsible for examining the claim, making an independent investigation, and reporting to the person who prepared the PPPR report. For the process to be transparent, an expression of concern or in an extreme case a retraction should indicate the scientific reasons for the action taken by the publisher and, when the action is approved, also require the name of the person who issued the PPPR report and the EIC or editors who oversaw the PPPR claim. That allows identification of possible COIs of third parties. Even though a retraction that originated

The Sunshine Act and Authors

John Glicksman and Debra Parrish

The Physician Payment Sunshine Act, part of the Patient Protection and Affordable Care Act, requires applicable manufacturers of drugs, devices, and biological and medical supplies covered under Medicare (or a state plan under Medicaid or CHIP) to report annually to the secretary of the US Department of Health and Human Services some payments or other transfers of value to physicians and teaching hospitals. The secretary is required to publish the reported data on a public Web site. The law raises multiple issues for authors of medical publications; some of the most important issues are highlighted below.

Under the Sunshine Act—and accompanying regulations issued by the Centers for Medicare & Medicaid Services (CMS)— applicable manufacturers were required to begin collecting data on payments made as of 1 August 2013, and they were required to begin reporting to CMS on 31 March 2014. How the law and regulations are applied and how manufacturers and others proceed remain to be seen. But legal requirements and issues that they raise can be identified.

The purpose of the Sunshine Act is to promote transparency. As CMS has noted, although collaborations among physicians, teaching hospitals, and industry manufacturers contribute to the design and delivery of life-saving technologies, payments from manufacturers can also introduce conflicts of interest that may influence research, education, and clinical decision making in ways that compromise patient care and can lead to increased costs. Thus, the law and accompanying regulations require manufacturers to report. The law and accompanying regulations do *not* prohibit or restrict the activities being reported; that task is left to other laws and regulations.

JOHN GLICKSMAN *was counsel to the firm of Parrish Law Offices* and DEBRA PARRISH *is a partner with Parrish Law Offices, Pittsburgh, Pennsylvania.*

As a threshold matter, the law and regulations require (1) an "applicable manufacturer" of (2) a "covered product" to collect data and to submit reports regarding (3) "transfers of value" to (4) "covered recipients". Generally speaking, an "applicable manufacturer" is a manufacturer that operates in the United States; a "covered product" is a drug, device, or biological or medical supply for which payment is available under Medicare, Medicaid, or CHIP *and* that requires a prescription (in the case of a drug or biological) or premarket approval by or notification to the Food and Drug Administration (in the case of a device or a medical supply that is a device); a "transfer of value" is anything of value; and a "covered recipient" is a licensed physician, other than a physician who is an employee of an applicable manufacturer, or an employee of a teaching hospital. CMS's regulations identify numerous refinements, exceptions, and specific applications of those definitions, but the foregoing generalizations can serve as a guide in evaluating—at the outset—whether a particular situation may fall under the new reporting requirements.

With specific regard to publications, it appears that a manufacturer's publication support could be considered a reportable transfer of value; CMS's report accompanying its issuance of its final regulations specifically mentions payments for medical research writing and/or publication. There may be questions as to the appropriate category under which a manufacturer might report support; for example, depending on the circumstances, a manufacturer might report support as a research payment or as compensation for services other than consulting. Note that publication support might include any support provided to an author for any publication to be submitted to a scientific or medical journal or provided for submission or presentation to a professional congress, and it might be provided either *directly* by a manufacturer or *indirectly* by an agency hired by a manufacturer.

Assuming that there is a reportable transfer of value, a manufacturer and a covered recipient need to determine the amount of value; CMS's report accompanying its final

regulations seems to indicate that reportable value is value that is received by a covered recipient *and* that is economically discernible. Thus, for example, there might be costs in developing a publication that are not borne by an author, such as legal expenses for drafting appropriate contracts, or that otherwise are not of discernible economic value. If those elements are parts of the total cost, it might be appropriate to subtract them from the reportable transfer of value.

There might also be a concern, with a multiauthored publication, of allocating value among the authors. CMS's report accompanying its final regulations does not appear to address that in detail. But it appears that such allocation might be done in numerous ways, depending on the relative contributions of the authors and whether all authors constitute covered recipients.

In addition to those issues regarding the development of publication content, there might be questions regarding the distribution of content. As noted above, support for presentations might constitute a reportable transfer of value. Furthermore, distribution of written publications might constitute reportable transfers, depending on how and to whom distributions are made. For example, CMS's regulations exclude from the definition of reportable transfer of value (1) transfers representing less than $10 and (2) transfers that directly benefit patients and that are intended for patient use.

Even if a manufacturer has made a reportable transfer of value, for some transfers the law and regulations provide for delayed publication by the secretary on the public Web site. According to CMS's report, such transfers include those made in connection with research that is pursuant to a written agreement for research related to new products. CMS's report adds that for transfers of value related to research for new applications of products already on the market, publication can be delayed only if the research does not meet the definition of "clinical investigation". CMS's report states that "clinical investigation" includes phases 1 through 4 clinical research for drugs and

biologicals and approved trials for devices (including medical supplies).

The Sunshine Act and accompanying regulations largely, *but not entirely*, pre-empt state and local laws and regula-

tions. Thus, manufacturers and recipients must determine whether any additional laws or regulations are relevant to specific situations. For most journals, authors must disclose conflicts of interest and funding

support. The Sunshine Act provides yet another mechanism for transparency in those relationships and adds the force of law behind the failure to make such a disclosure.

in a PPPR report may serve as a form of public shame among peers, it also serves the important function of a deterrent for scientists who wish to commit scientific fraud or for those who accidentally and carelessly undermine the importance of QC before submission of a manuscript to a journal. With PPPR, a decision made by an EIC or editors—usually on the basis of peer reviewers' reports—does not determine the final status of a published paper. PPPR would also help to eliminate actual or perceived bias inherent in the traditional peer-review process[7]. Finally, a PPPR report would lead to a public historical record of scientific misconduct or fraud or lack of QC and should thus not be subject to copyright.

When a PPPR report is received by an EIC or publisher who flatly refuses to examine it—because it is outdated, because it may overburden the review system, or because of professional pride or arrogance—how can it be made public to raise awareness? Revealing a scientist's identity in a PPPR may expose the scientist to professional abuse or bias, reveal COIs, and damage his or her reputation, even though, as Yong and colleagues[6] indicate, "a person has the obligation to do the right thing if they can." The adverse and unintended consequences of an EIC's or publisher's failure to act on a PPPR report that factually lists errors, fraud, or misconduct are that such a paper will continue to be referenced in the literature; that is, continued recognition will be given when it should no longer be. In such a case, who should be held accountable for intransigence and professional negligence?

PPPR is an important way—whether used anonymously or not—to raise awareness about and correct errors in the plant-science literature[8]. Even if somewhat controversial, PPPR is an effective tool.

Although still in a nascent stage, open-commentary tools used by such publishers as Frontiers (*www.frontiers.org*), open peer-review systems used by such journals as F1000 Research (*http://f1000research.com*), and such tools as PubPeer (*https://pubpeer.com/*) and PubMed Commons (*www.ncbi.nlm.nih.gov/pubmedcommons/*) are all evidence that PPPR is becoming established as a way to correct the scientific literature and expose scientific misconduct and fraud.

Summary

Errors in the plant-science literature can have fundamental adverse consequences for science and society. Incorrect findings and fraudulent data in scientific reports of research that cannot be reproduced may corrupt the literature, burden taxpayers, and diminish public trust in science. Inefficient, incomplete, and biased peer review aids that erosion, as does—to some extent—the rapidly evolving open-access movement. However, open access also provides a way to detect poor science, misconduct, and fraud. A spike in retractions in the biomedical sciences may reflect a rise in awareness of and action to correct research and publishing misconduct and improved methods for detecting such misconduct. An effective way to fortify the validity of data and to sustain trust among science peers and the public is required. Postpublication peer review (PPPR) is one concrete solution. PPPR complements traditional peer review and allows trust in the peer community to be regained. However, it will take an active effort by scientists, editors, peer reviewers, and publishers—the cornerstones of the publishing process, each with their own responsibilities, pre- and postpublication[9]—to improve and

correct the plant-science literature. PPPR will undoubtedly be embraced by some and skeptically shunned by others.

Conflict of Interest Statement
The author declares that the research for this paper was conducted in the absence of any commercial, financial, or other relationships that could be construed as a potential conflict of interest.

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From Open Access, to Twitter, to Science Fiction, to Film: Some Communication-Related Highlights of the 2014 AAAS Annual Meeting

Mary Beth Schaefer, Christina Sumners, Sara Carney, Jessica Scarfuto, Gina Marie Wadas, and Barbara Gastel

Subtitled "Meeting Global Challenges: Discovery and Innovation", the 2014 annual meeting of the American Association for the Advancement of Science (AAAS), held 13–17 February in Chicago, contained numerous sessions on meeting challenges in communicating science. Sessions addressed communication with a variety of audiences, including scientists, journalists, and segments of the public. They also dealt with such channels as publications, presentations, and social media. The following are highlights of some of the sessions.

Scholarly Publishing Innovations and Evolution: Views of the Stakeholders

Mary Beth Schaefer

The push for open access to published research could pit researcher against publisher against librarian, but as a panel of presenters at the AAAS annual meeting showed, a symbiotic relationship might be the key to granting full public access to scholarly publications.

The symposium "Scholarly Publishing Innovations and Evolution: Views of the Stakeholders" took place just 2 days after AAAS announced plans to release its first fully open-access journal, *Science Advances*.

MARY BETH SCHAEFER, CHRISTINA SUMNERS, SARA CARNEY, JESSICA SCARFUTO, *and* GINA MARIE WADAS *all are students in or recent graduates of the master's degree program in science communication at Texas A&M University.* BARBARA GASTEL, *a professor at Texas A&M University, coordinates the program.*

The presenters, each speaking from a different perspective, had served together on the Scholarly Publishing Roundtable, a group that spoke to Congress and other federal components in 2009 to gain support for open access. At the symposium, they described the origins and progress of this movement and the challenges that it faced.

John Vaughn, executive vice president of the Association of American Universities, described policies and programs promoting open access and the research university's stance. Crispin Taylor, executive director of the American Society of Plant Biologists, an organization whose operating revenues depend largely on its journals, presented a business perspective. To grant open access, the organization's business model must shift to rely on other sources of revenue.

Scott Plutchak, of the University of Alabama, Birmingham, offered views and experiences of libraries regarding open access. Affordability, he said, is a primary concern, as library budgets struggle to keep up with costs of publications. Some librarians' misconceptions of publishers have led to bitterness among stakeholders. Plutchak stressed the need to "move past the open-access war" and work collaboratively toward a solution.

Communicating Science: A Seminar

Christina Sumners

The AAAS meeting included a day-long seminar "Communicating Science", which was broken into sessions. In the first, "Engaging with Journalists", science journalist Carl Zimmer, who has written for *The New York Times*, said the nature of science reporting has changed. To illustrate, he noted that Stephen Hawking recently posted on the Internet a two-page article, which was soon written about in *Nature*, *New Scientist*, and other publications. Although most articles posted online won't get the coverage of one by Hawking, Zimmer asked the audience to consider what happens when the traditional methods of peer review are not used: How can science journalists know what is "good" enough to report on?

It is increasingly difficult to know what is sound science, said panelist Paula Apsell, executive producer of NOVA. However, Zimmer said, peer review is still the benchmark that most science journalists use for identifying sound science, although there are situations, such as the Hawking paper, in which research comes out in its raw form and journalists and their editors must decide what to do with it. Scientific and medical journals can help reporters by providing information about their upcoming peer-reviewed articles well before publication, because reporters need time to pitch the stories to their editors.

Another communicating-science session, "Engaging with Social Media", focused on how scientists can best use the new platforms to share their research. Kim Cobb, a faculty member in earth and atmospheric sciences at the Georgia Institute of Technology, shared her experiences with social media. She noted that scientists are often uncomfortable with nontraditional self-promotion and tend to love caveats—which generally do not work well on social media. Furthermore, each piece of research is only an incremental change in the body of knowledge, she said, and it can be difficult to communicate nuance or the importance of each small step through social media. Overall, though, Cobb was optimistic and offered tips for those trying to communicate science over social media: Make it personal, tell a story, and use humor. Most important: Use as many photos as you can.

Also at that session, Danielle N Lee, a postdoctoral researcher at Cornell University and blogger for *Scientific American,* said that many underserved

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groups get most of or all their news and information from social media, so it may be the best way to reach them. Her practical advice? Search the name of the field of interest and something like "top twitter" to get a good list of people to follow. Once a Twitter account has followers, it is important to publish regularly and engage in conversations with readers.

Videos from this seminar can be accessed at *www.aaas.org/page/2014-annual-meeting-communicating-science-seminar*.

Getting Started in Social Media

Sara Carney

You've picked out your Twitter handle and Facebook profile picture. Now what? Social media can be a great way to reach a large and diverse audience but can be intimidating at first. The presenters of "Getting Started in Social Media" described how newcomers can get the most out of Twitter, Facebook, and blogging.

Bethany Brookshire, a blogger at *Science News*, discussed Twitter, which provides minute-by-minute updates, including links to new articles from around the Internet. To enhance your Twitter experience, Brookshire recommends following not just your friends but organizations and news outlets that interest you. Replying to tweets, retweeting, and using a hashtag (a word or phrase that follows the "#" symbol, which is used as a searchable metadata tag) will allow you to contribute on trending topics and increase your profile visibility. Brookshire reminded the audience that tweets are limited to 140 characters, which is great for those good at one-liners but can be challenging.

It would be hard to discuss social media without mentioning Facebook. Christie Wilcox, a blogger at *Discover Blogs*, noted that Facebook contains two major types of profiles—personal timelines and public pages. Timelines, which have a wide array of privacy settings, are typically used for networking and connecting with friends. By adjusting your privacy settings, you can let people other than your Facebook friends follow your timeline. In contrast, public pages are generally used for organizations and public figures. One benefit of having a page is that you can

monitor trends in popularity and thus tailor content to your audience.

What if you want to write more than 140 characters and don't "like" Facebook? Blogger at *Scientific American* Danielle N Lee recommends using blogging for more in-depth science writing. Blogs can be used to showcase one's writing and give readers more detailed updates. However, blogging can be time consuming. Lee recommends blogging frequently or not at all. Alternatives for those not ready for such a commitment, Lee said, include contributing guest posts and comments to existing blogs.

All the presenters emphasized that the content posted to social-media sites is not necessarily private. And they warned that "trolls" (people who cause intentional disruption) should be deleted "early and often". Despite those concerns, all endorsed social media as useful additions to the array of tools for communicating science.

Where's My Flying Car? Science, Science Fiction, and a Changing Vision of the Future

Jessica Scarfuto

Given the session's focus on the future of science and technology, it was ironic that the session began 20 minutes late because of technical difficulties. Nevertheless, the session provided thought-provoking points on the interplay of science, science fiction, and the future of technology.

The speakers, who included both scientists and science-fiction authors, addressed topics as varied as astrophysics, artificial intelligence, robots, and the environment. Lawrence Krauss, a theoretical physicist and science writer who is a professor at Arizona State University, spoke on the technologies of time travel, warp drive, teleportation, and space travel. "The *Star Trek* writers say you'd be turned into chunky salsa on the back of the spacecraft because *g* forces would kill you," he said, explaining why events will not occur as imagined in science fiction. "The way we're going to travel through space, if humans survive, will be with slow ships that take a long time and never come back."

Following Krauss was award-winning science-fiction author Catherine Asaro,

who discussed artificial intelligence and the possibility of "genius machines" as computer technology continues to advance. Exploring the philosophical question of what makes something alive or even human, she reflected on ethical dilemmas posed by using technology to advance human abilities.

David H Grinspoon, astrobiologist and the first Baruch S Blumberg NASA/Library of Congress Chair in Astrobiology, discussed the interplay of science and science fiction as related to the possible presence of life elsewhere in the universe. "Our idea that life has to be in the 'habitable zone' is rather skeptical and closed minded," he said. "It's a fine way to make life, but I wouldn't be surprised if somewhere out there nature has cooked up a completely different way of doing it."

The session ended with a talk by science-fiction author Kim Stanley Robinson. Robinson stressed the importance of scientists' involvement in politics and discussed what might occur next in Earth's ecological evolution if we keep following political and economic approaches that do not reflect true costs.

A recurrent theme in the session was that science fiction contributes substantially by inspiring countless young people to become interested in science—an important contribution regardless of whether science fiction predicts the future.

Promoting Science through Storytelling: A Case Study

Gina Marie Wadas

137 Films, a nonprofit documentary production company, emphasizes the people involved in science, and not the science itself, to promote science through storytelling. "Scientists are not just talking fact sheets," stated Executive Director Clayton Brown. "Scientists are people."

Brown and Artistic Director Monica Ross of 137 Films, with Kurt Riesselmann, head of the office of public information at Fermi National Accelerator Laboratory (Fermilab), spoke about their collaboration on the science documentary *Science at Work*. They discussed how the use of storytelling

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in science documentaries, by emphasizing characterization, can promote science and the public's understanding of science. The film portrays the home and work lives of the people behind the science done at Fermilab.

Speakers at the session said 137 Films wants its audience to see that scientists are not so different from everyone else. Its documentaries provide only as much science as needed to tell the story. Narration is purposely not included. Therefore, animations, subtitles, and captions are provided for clarification, as are analogies by those featured in the film.

The hope of 137 Films is to display the aspects of science that the public does not see but should know about. Those aspects include the amount of preparation needed for a project, the hopes and fears of the scientists, and what scientists experience when funding for their projects is canceled.

Documentaries are "a halfway point between fiction and research papers," Brown said. Brown and Ross emphasized that storytelling is important for science. They want their documentaries not to provide the public with answers but to promote discussion and show science in action.

Communicating with the Naked Scientists: A Live Podcast

Mary Beth Schaefer

"At night I strip off my clothes and become the naked scientist." With those words, British radio personality Chris Smith exposed himself as creator of the BBC's award-winning podcast "The Naked Scientists". Smith moderated the AAAS special event "Communicating with the Naked Scientists: A Live Podcast", during which a panel of science communicators held a Q&A session attended by researchers, educators, and science journalists.

The Naked Scientists are a group of researchers at Cambridge University who, according to their Web site, "strip science down to its bare essentials, and promote it to the general public" through various media. Smith and the other panel members answered questions about this "promotion of science" to various audiences. Some of their responses are summarized here.

Q: "How do you communicate the benefits of emerging technologies like robotics when we don't fully understand what they'll be used for and how they'll work yet?"
According to panelists, science-fiction books, movies, and television shows often inspire new technologies and let readers experience emerging scientific innovations. Robyn Williams, a broadcast science journalist in Australia, suggested that letting people experience science firsthand through demonstrations and displays is another strategy to promote understanding. Molly Jahn, of the University of Wisconsin, and Kathleen Kennedy, of the Massachusetts Institute of Technology, mentioned that middle-school and high-school robotics programs are also good ways to introduce children to emerging technologies.

Q: "How do we move forward in communicating science to a public that still questions its most basic foundations?"
Panel members approached this question from different angles. Marc Abrahams, founder of the Ig Nobel Prize Ceremony, questioned whether the public's belief in evolution matters, inasmuch as it might not affect people's daily lives. David Willetts, British minister of state for universities and science, focused on education policy that dictates the teaching of evolution or creationism. With regard to education, a boundary must be drawn between religion and science, he said.

Q: "Climate-change deniers often use the tools of propaganda to further their campaign. Should science be embracing similar tools?"
The panelists seemed to agree that propaganda would not make sense for the communication of science, in that science is based on reason, not faith. Some hinted that the strategy being used to communicate climate change, however, could be made more effective. Williams acknowledged that the fight between deniers of climate change and scientists is not balanced. "I think it's time the scientists really got up, didn't use propaganda, but used short, sharp sentences and fought equally," he said.

To hear the rest of the panel's advice, you can listen to a free recording of the session on The Naked Scientists Web site, *www.thenakedscientists.com*.

The AAAS annual meeting included many other sessions on communicating science in addition to dozens of sessions on scientific topics and issues. The session "Building National Capacity in Science Communication for STEM Graduate Students" focused largely on public communication of science; it included presentation of a rubric for assessing oral-presentation skills. Another session, "Teen Cafés: Innovative Model for Effective Science Communication with Key Demographic", included descriptions of science-outreach activities for teenagers, advice on arranging such activities, and information on the Teen Science Café Network (*teensciencecafe.org*). A variety of career workshops—such as "AuthorAID: A Service to Use and a Chance to Serve" and "Editing Your Own Papers and Proposals: How to Wow Reviewers and Aid Readers"—addressed practical aspects of the communication of science.

In a plenary lecture to a standing-room-only audience, Alan Alda offered advice on communicating science to general audiences. Best known as an actor in television and film, Alda hosted for 13 years the PBS series *Scientific American Frontiers*; he now is a visiting professor at the Alan Alda Center for Communicating Science at Stony Brook University. In his lecture, titled "Getting Beyond a Blind Date with Science", Alda emphasized the importance of storytelling in engaging one's audience; accordingly, he incorporated multiple anecdotes. He also emphasized understanding the audience, distilling one's message, avoiding jargon, and including emotion. Information that is conveyed through emotionally charged stories, he observed, tends to be remembered.

An account of Alda's presentation can be accessed at *www.aaas.org/news/alan-alda-good-communication-can-keep-scientists-and-public-committed-relationship*. Audio recordings of many sessions of the AAAS meeting are available; for information, please see *www.dcprovidersonline.com/aaas/*. The next AAAS annual meeting (theme: "Innovations, Information, and Imaging") will take place 12–16 February 2015 in San Jose, California.

Authorship

Iain Taylor and Bruce Dancik

The author byline tells the editor, peer reviewers, and readers who did the work. Simple, isn't it? Except that throughout the scholarly community, "who did the work" may include the originator of the idea, the writer of the funded grant proposal, the critical readers who honed the proposal into a "doable" piece of research (interested colleagues, interested students, or visitors who provided opinions and improvements), the person who designed the particular experiment, the student or postdoctoral associate who executed a major or critical part of the study, the paid technicians and statisticians (who also may have analyzed and interpreted the data), the professional writer, or an institutional editor. You may have struggled looking for the end of that sentence, but we could probably have added a few more people.

The list goes on and may eventually include one or more of the peer reviewers and even the "first-decision" journal editorial-board member. The long-standing tradition in science is that the person who has been designated as the principal investigator is one of the authors, commonly the first person, the last person, or the person designated as the corresponding author. In one of the recent preliminary papers reporting the discovery of the Higgs Boson,[1] more than 2,400 people are listed in a supplementary statement, whereas the byline states simply "The ATLAS Collaboration". A recent paper in *Science*[2] had as the byline that "All authors with their affiliations appear at the end of the paper."

Credits for scholarly advances are recognized largely through the lists of authors on

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the bylines of published research reports, so it is perhaps not surprising that professional advancement is determined largely on the basis of authorship of published (usually peer-reviewed) papers. However, it seems that members of appointment and promotion committees occasionally superimpose their own understanding of how author sequence reflects the importance of a candidate's contribution to publications. Such cases may be avoided if there is a clear explanation from the originating department head or chair. Peer review is a process that provides the journal editor and the reader with an assessment of the originality and quality of submitted research and some sense that the work is perceived by informed colleagues as being relatively reliable and thus likely to add to the base of knowledge and understanding in the field. The paper is of course not "the truth" but is a report of the results of research undertaken with attention to acceptable standards in a discipline.

It is increasingly apparent that the requirements of authorship can be flexible. Authorship has also been used in attempts to gain favor with mentors, senior colleagues, eminent peers, and others. Some scholarly subcultures add the names of distinguished scholars to the author list (gift or guest authorship) in the belief that peer reviewers and even editors will be swayed to recommend acceptance. The level of trust that prevails in the scholarly community generally makes it unlikely that the appearance of these so-called guest authors will be questioned, but several leading journals increasingly require a statement of what each named author contributed to the paper. Such practices are more common, and apparently continue, in countries and communities where outside financing seems to depend on the established or perceived excellence of a research group, such as a department or a major research organization. One may be left to wonder how a person managed to publish more than 3000 papers in his or her career that spanned 40 years!

The single-author paper may be the norm in some fields and identifies the

person who did all the work, but there are still cases in which a graduate student or research assistant may be unlisted because the identified author perceives that the student has simply done as directed. Many years ago, one of us was admonished for including a research technician as first author. The concern was that the technician was simply following instructions (he was really a major contributor to all the work) and was not considered to have the stature to be an author.

Donald Kennedy, the former editor-in-chief of *Science* (2000–2008) and a former president of Stanford University, wrote in his book *Academic Duty*,[3]

The most common abuse in authorship is the addition of the names of academic supervisors to largely independent work done by students. The fact that this has become a custom in a number of fields does not make it less pernicious. In some institutions, co-authored articles are even allowed in a student's Ph.D. thesis. This practice not only confuses later evaluators about the degree of independence involved in the work of a student, but also constitutes a challenge to the very notion of a doctoral dissertation. The idea behind the thesis is that it is a piece of original work, done to demonstrate that the student is ready for an independent scholarly career. But if as part of it, there appears a work jointly authored by the student and his or her academic advisor, one of two things is amiss: either the work isn't independent, in which case it should not be part of the dissertation, or it is (independent), in which case it is a plain case of complimentary (guest) authorship.

Ed Huth[4] suggested some years ago that an author is a participant in the research and "can take public responsibility" for the work. However, although that description opens a door for several participants, such a test may also raise the question of the sequence of names.

The authorship issue can be broken into the following:

Who has earned authorship?
What shall the sequence of names indicate?
Who shall be acknowledged?

An increasingly common approach requires full agreement among all participants as to who should be an author after completion of the work and the written report. Indeed, the writing author needs to know who the participating authors are and be assured that the list of authors reflects the reality that the original work could not have been achieved without specific contributions by each named person. There may be useful measures—time spent, expertise to obtain or analyze and interpret the new data or ideas, critical evaluation of the presentation, and limits of the written report. Supervision of students or successful application for research funding may not merit authorship if a research supervisor has done little to direct the work or if the work has little or no relation to the funding.

Interdisciplinary research requires a particularly thoughtful approach to considering the authorship criteria of the participating disciplines. The purpose remains the same: to ensure that recognition goes to the doers of the work. Expectations will vary when the research brings together people who have widely different traditions and practices, as perhaps in education, political science, clinical psychology, and clinical and laboratory medicine.

Work that requires the use of surveys and work that involves interpretation of both qualitative and quantitative studies may require amendment of starting operational details as new information is obtained, particularly when survey subjects drop out and a statistical assessment changes or is even invalidated. Design of a survey may warrant authorship especially when the people who plan the work rely on expert details for subject recruitment and the continuing support of recruited participants. Clinical studies may rely heavily on expert knowledge to recruit subjects, and evidence of researcher activity may be measured by the number of survey subjects recruited. People may have

only one function—to recruit subjects who meet stated criteria—and such activity may or may not require intellectual understanding of the work. Although acknowledgment clearly is essential, authorship criteria may not be met.

The problems become more complex if planning is determined by the nature of a question posed in theoretical or contract work in which research is undertaken to find support for a theory or to satisfy the contractor's desire for a specific answer. Regulators of medical or industrial product safety may prefer arms'-length studies, but under best practices of research it may well be that a study conducted by a contractor's research employees yields high-quality information. However, it is apparently common for staff of contracting companies to prepare a manuscript (written by a "ghost author") to present the company's research in the most positive light and then invite an expert "independent researcher" to provide a presubmission opinion for a monetary reward in return for placing the independent's name on the byline (as a "guest author"). Such ghost authorship is much frowned on and may be declared gross misconduct by journals, but university authorities seem unwilling to take disciplinary actions against what the journal-editing community sees as a major breach of scholarly integrity. Conflicting interests are common throughout academe, government, and industry. "Named" guest authors, from the earliest-career researcher to the most senior academics and research managers, especially where scholarly integrity may be compromised, must be eliminated from research reporting in order for publications to earn and retain the highest levels of public and professional trust. Every author has a duty to take full responsibility, as Ed Huth so clearly and elegantly described. It is still a problem when early-career researchers name a distinguished researcher (perhaps a mentor) as an author with or without the agreement of the senior person, who possibly has little or no knowledge of the work. The reverse may also occur when a senior researcher adds a junior's name "because you really need another paper to increase your publication

list". In short, although "ghosts" may serve a commercial purpose to steer results to increase chances of regulatory approval or direct advertising, "guests" have no place in research reporting. The obligation remains: Authors must be fully responsible when their names are on a byline.

"Big science" projects often require much diverse expertise and long-term research commitment to the content of a paper. Particle physics and astronomy are two fields in which research is no longer possible without numerous collaborators in many sites around the world. Whose names should be on the resulting papers? The information magazine *Science Watch*[5] noted that the Fermilab had captured the top quark, and hundreds of researchers had shared in the hunt. The paper, published in *Physical Review Letters*, had nearly 400 authors. A paper titled "Correlation of the Highest-Energy Cosmic Rays with Nearby Extragalactic Objects", published in *Science*[6] by the Pierre Auger Collaboration has 450-plus authors listed under the Collaboration byline. It also has an authors' summary of contributions. A short piece titled "Really Big Science: Multiauthor Papers Multiplying in the 1990s"[7] reported that *Science Watch* published a graph showing a dramatic rise in papers that had more than 50 authors during the years 1981–1994. The greatest numbers at that time were in physics, but there was also a steady rise in numbers of authors in the medical literature. Individual contributions to the papers may seem fundamentally different from those to two-, three-, or four-author papers, but it is apparent that research could not be completed without so many contributing researchers, so each was clearly deserving of recognition on the byline. There are occasional papers in which equal author contributions are stated; see, for example, reference 8, in which the four named authors are explicitly stated to have contributed equally to the work.

(Although rewards of authorship are related largely to career advancement or funding, one case of election to the US National Academy of Sciences resulted in a strange predicament. A news item[9] in *Science* reported that Nancy Jenkins was elected to membership in the academy but refused

continued

because husband Neal Copeland was an absolutely equal partner in their research and they alternated as last author on 750 papers. Dr Jenkins argued that competing with him would mean not staying married.)

Contributorship and guarantorship policies obviously remove much of the ambiguity surrounding contributions, but they leave unresolved the question of the quantity and quality of contributions that qualify for authorship. The International Committee of Medical Journal Editors (*www.icmje. org/*) has recommended the following summarized criteria for authorship, which are appropriate for journals that distinguish authors from other contributors[10]:

- Authorship credit should be based on 1) substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND 2) drafting the work or revising it critically for important intellectual content; AND 3) final approval of the version to be published; AND 4) agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.
- Authors should meet conditions 1, 2, 3, and 4.
- If a large multicenter group has conducted the work, the group should identify the persons who accept direct responsibility for the manuscript. Those persons should fully meet the criteria for authorship, and editors will ask them to complete journal-specific author and conflict-of-interest disclosure forms.
- Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content and identify which of the co-authors are responsible for other portions of the content.

Several examples of presenting the order of authors in a byline exist, and they seem to be generally accepted by all named authors. The published list of authors may include a footnoted statement, such as "the first two authors contributed equally to this work." It

is often presumed by readers and by research administrators that the first author is the primary doer of the research and the last author is the professionally senior participant, or in some cases it may be the reverse. Some research groups determine who has earned authorship and then list the authors alphabetically. In such cases as the Higgs Boson work, the authors are identified by the name adopted by all the participants, hence "the CMS Collaboration" and "the ATLAS Collaboration". Each of those articles included an acknowledgment that recognized the outstanding performance of the Large Hydron Collider at CERN and the Partners in the WorldWide LHC Computing Grid for crucial computing support.[1] Partnerships and contributions to the research were presented without the need to spell out all details of individual contributions.

Smaller research groups seem generally accepting of giving credit where credit is due. In a roundtable conversation, it can become clear that each participant can explain and defend his or her contribution. Principal investigators who wrote the funding proposal may want their names on the byline regardless of their not contributing to the research, but a principal investigator may not require recognition as an author when a junior researcher has undertaken a project that is of peripheral interest to the group and did all the work. Every researcher has a professional responsibility to ensure that recognition is afforded appropriately, for example, as an author assistant or contributor in some material way. One of us, on a couple of occasions while editor of a journal, was contacted by authors who asked that the referee of a manuscript or the journal associate editor for a manuscript be added to the list of authors because their remarks were helpful in analyzing results and improving the manuscript. In each case, the referee and associate editor declined the offer of authorship, we believe appropriately, on the grounds that they were just doing their job and trying to help an author to communicate his or her work more effectively to readers.

But does willingness to share experimental materials or data that others may wish to reinterpret or to share information and ideas

provided during open peer review merit recognition as authorship? In the new world of "open access" through open peer review before official publication, do we need to think more freely about authorship or even find some other way in which appropriate credit can be assigned for new work? Should open reviewers who contribute substantially to a manuscript be added to the author list? Within a specific research community, members learn or come to understand the ways and means of their colleagues (competitors or noncompetitors) so that credit is fairly understood. Problems may arise, however, when professional advancement is granted by administrators (members of appointment and promotion committees) who are not part of this research community.

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Correct Terminology in Science: Industry Glossary of Abbreviations

Lindsey Buscher

Many new acronyms and other abbreviations have entered the scene in the last several years, so to help you stay on top of it, here are a couple of lists of some that are relevant to the scientific and technical publishing world. Some have been around for many years, but they may have gotten buried in your lexicon with all the new ones piled on top. These lists are certainly not exhaustive, but they are meant to serve as either a refresher for veterans in the field or a go-to guide for those new to the academic publishing community.

Organizations and Initiatives

AAAS = American Association for the Advancement of Science
AAP = Association of American Publishers
AJPP = African Journals Partnership Project
ALA = American Library Association
ALPSP = Association of Learned and Professional Society Publishers
AMA = American Medical Association
AMWA = American Medical Writers Association
BELS = Board of Editors in the Life Sciences
CC = Creative Commons (copyright licensing)
CHORUS = Clearinghouse for the Open Research of the United States
CONSORT = Consolidated Standards of Reporting Trials
COPE = Committee on Publication Ethics
DMCA = Digital Millennium Copyright Act
DOAJ = Directory of Open Access Journals
DORA = San Francisco Declaration on Research Assessment
DPLA = Digital Public Library of America
EASE = European Association of Science Editors
EQUATOR Network = Enhancing the QUAlity and Transparency Of health Research
ETDEWEB = Energy Technology Data Exchange World Energy Base
IRB = institutional review board
ISMTE = International Society of Managing and Technical Editors
MLA = Modern Language Association *or* Medical Library Association
NCBI = National Center for Biotechnology Information
NISO = National Information Standards Organization
NLM = National Library of Medicine
ORCID = Open Researcher and Contributor Identifier
ORI = Office of Research Integrity
OSTP = Office of Science and Technology Policy
PMC = PubMed Central
SSP = Society for Scholarly Publishing

Terms

CLOCKSS = Controlled Lots of Copies Keep Stuff Safe
CMOS = *Chicago Manual of Style*
DOI = digital object identifier
DRM = digital rights management
Dryad = online data repository
DTD = document type definition
DTM = digital terrain map
EPUB = electronic publication
FTP = file transfer protocol
HTML = hypertext markup language
ISBN = International Standard Book Number
ISSN = International Standard Serial Number
JIF = journal impact factor
LOCKSS = Lots of Copies Keep Stuff Safe
MOOC = massive open online course
OA = open access
POD = print on demand
RSS = rich site summary *or* really simple syndication
Scopus = abstract and citation database of peer-reviewed literature
SSF = *Scientific Style and Format*
STIX = Scientific and Technical Information Exchange
STM = scientific–technical–medical
TDM = text- and data-mining
XHTML = extensible hypertext markup language
XML = extensible markup language

LINDSEY BUSCHER *is managing editor, Allen Press, Lawrence, Kansas.*

Solution Corner

Kenneth F Heideman

Dear Solution Corner:

Automated plagiarism-detection tools seem to be gaining a lot of traction in the STM publishing community. What should I know about their potential benefits and limitations?

Signed, Wondering in Walla Walla, Washington

Dear WWWW:

A number of excellent tools are emerging to assist editors in this regard. *SC* cannot endorse one over another, but we can help you to understand what you can expect from these tools. One of the most important things to know is that in practice these are *similarity*-detection tools; until further notice, human beings must ultimately determine what is actual *plagiarism*. So an important consideration for any organization that is considering one of these tools is whether it already has clear guidelines for authors on what constitutes plagiarism and clear practices for its staff or volunteer editors to fol-

KENNETH F HEIDEMAN *is director of publications, American Meteorological Society, Boston, Massachusetts.*

low when plagiarism is detected. Adopting a similarity-checking tool before thinking through policies and practices could result in the organization's being presented with a plethora of information without having a clear path forward for dealing with it.

Most similarity-checking tools will give you a report that shows which text in a given manuscript is identical with text elsewhere. Depending on the tool and your settings, "elsewhere" can be as broad as "the Internet" or narrowed to include only material archived in specific databases (PubMed, for instance). Most tools will allow you to narrow your search by excluding some parts of the manuscript that you are checking (you might not want to include the reference list, for instance). The report will usually tell you what overall percentage of the manuscript matches other sources and then break down the matches to show you how much of the manuscript is similar to particular sources. The most sophisticated of the tools will make their reports available to you in an online version and will include live links to the sources so that you can easily navigate between the manuscript that you are checking and the source of similarity.

Most of the tools allow you to choose when to do a similarity check and on which manuscripts: You may choose to submit all your manuscripts or just a portion of them, and you may choose to do similarity

checks only on new manuscripts, only on manuscripts that are ready for publication, or some combination. Organizations that run similarity reports on a large number of manuscripts may find it useful to spend a few months in observing the overall similarity scores for manuscripts and in finding a comfortable "threshold" score below which it is not usually worthwhile for a human to take a further look.

An additional thing to keep in mind is that similarity-checking tools often reveal self-plagiarism, whereby an author neglects to cite formally portions of papers that he or she published previously. The extent to which that is a violation of ethics depends on the scientific community in question, but in many circles it is considered to be as serious as plagiarizing the work of others.

In summary, WWWW, the advent of these powerful tools is a double-edged sword, like so many other things in life. On the one hand, they constitute a breakthrough that should make the maintenance and enforcement of a high standard of publishing ethics easier as part of the peer-review process. On the other hand, the results that they provide often raise questions and concerns that do not have clear-cut answers. Ultimately, even the best of the automated tools require editors to be adequately trained in the nuances of the results for them to be truly effective in practice.

The New Face of the Council of Science Editors: Moving Forward, Reaching Out

Tony Alves, Amanda Ferguson, and Jonathan Schultz

In September 2011, the Council of Science Editors (CSE) membership was surveyed by the CSE Web Committee about the use of and satisfaction with its Web site. It became clear from the responses that to serve its community best CSE needed to redesign the site. After much deliberation, the Board of Directors decided not only to give the Web site a new modern look but to consider how CSE presents itself to members, potential members, and the larger scientific and publishing community.

During summer 2013, the Board appointed the Marketing Task Force in response to a recognized need for tactical engagement in member recruitment and retention, branding, and visibility of CSE and of scientific editing in general. The Marketing Task Force was charged with the following responsibilities: to develop a strategy for coordinated marketing of all CSE activities, products, and services; to support the University of Chicago Press in the launch of the revised CSE style guide, *Scientific Style and Format, 8th Edition* (SSF8); to develop a new CSE logo; and to assist the Web Committee in designing a new CSE Web site. By February 2014, the task force was decommissioned (3 months early) because it had successfully completed all its charges! The following is a report of the results.

TONY ALVES *was chair of the CSE Marketing Task Force and is director of product management, Aries Systems Corporation, North Andover, Massachusetts;* AMANDA FERGUSON *was chair of the CSE Web Committee during the redesign and is associate director, Institute of Food Technologists Scientific Journals, Chicago, Illinois;* JONATHAN SCHULTZ *was vice chair of the CSE Web Committee during the redesign and is managing editor,* Circulation Research, *American Heart Association, Baltimore, Maryland.*

Fig. 1. One of the two versions of the new CSE logo.

A New Marketing Committee

In reaction to the daunting task of developing a strategy for marketing all CSE activities, products, and services, the Marketing Task Force decided to form a new permanent Marketing Committee that would take on this effort. The committee was established in February 2014 and is cochaired by Byron Laws and Jennifer Deyton. They enlisted 13 volunteers to serve with them. Oversight of the Social Media Subcommittee has been moved from the Membership Committee to the Marketing Committee.

Launching *SSF8*

The official launch of *SSF8* coincided with the CSE 2014 annual meeting in San Antonio. Lindsey Buscher worked tirelessly with the University of Chicago Press to get the new style guide to press in time for the launch, and her and her team's efforts are much appreciated. Initial marketing ideas are in place, and promotion of *SSF8* will be the responsibility of the new Marketing Committee.

New CSE Logo

In 1979, Bernard Forscher, the editor of what was then called *CBE Views*, described the new Council of Biology Editors logo as "a pen in a flask in a circle. It says that the written word (the pen) has a central place in science (the flask) and that CBE encompasses (the circle) all aspects of the function of the pen in science. Having a logo says we are claiming identification as a distinct entity, that CBE is" (Forscher B. 1978;1(1):2). That statement was a guiding principle as the CSE Marketing Task Force worked with Windmill Design (*www.windmilldesign.com*) to come up with a new CSE logo that is both respectful of the past and appealing to modern sensibilities.

The new logo design, debuted in this issue of *Science Editor*, quickly rose to the top of the heap as we evaluated seven logo ideas. One looked like an element on the periodic table, another resembled a cartoon dialogue bubble, and a few had abstract symbols that could be interpreted in various scientific ways. Considering that the old logo served CSE well for over 35 years, the new cleaner, simpler flask and pen design stood out as the obvious choice. The Marketing Task Force recommended it to the CSE Board of Directors, which

Fig. 2. One of the two versions of the new CSE logo.

continued

approved the new design unanimously. The logo has two versions, one with the words "Council of Science Editors" in a circle around the flask and pen (Figures 1 and 2), and another in which "Council of Science Editors" sits beside the flask and pen. Either can be used as the official logo. Two versions were approved to allow flexibility in how the logo is used on paper and online. Will this logo serve CSE for another 35 years? Perhaps!

New CSE Web Site

Technology is an essential component of scientific publishing and communication, shaping both the presentation and the processing of content at an ever-increasing clip. Much has changed from the early days of the Council of Biology Editors, when mimeographed newsletters were sent through the mail. At the turn of the century, CSE's current name was adopted after a "fax-back" poll, and the primary goal of the redesign of the Web site was to create a vibrant and engaging site that would present CSE as the modern, cutting-edge organization it is.

With that in mind, we set out to redesign the Web site with these objectives: modernize the look and feel of the site; improve navigation and content organization; develop responsive, mobile-friendly versions of the site; and update content as needed to ensure its usefulness to CSE members. We wanted a clean, dynamic site that features key content and aligns with CSE's mission: "to serve editorial professionals in the sciences by creating a supportive network for career development, providing educational opportunities, and developing resources for identifying and implementing high-quality editorial practices".

The Web Committee worked closely with the Marketing Task Force to set out goals and a timeline for refreshing the public face of CSE. Two members of the Web Committee, Amanda Ferguson (Chair) and Jonathan Schultz (Vice Chair), managed the project, working with the other committee chairs to review content on the existing site and with Windmill Design
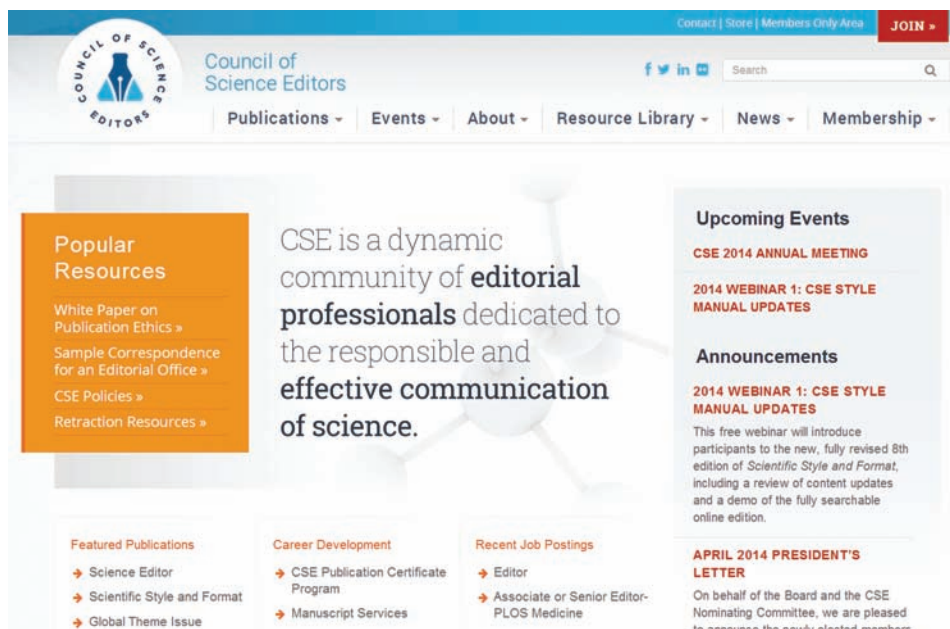

Fig. 3. CSE's new Web site home page (*www.councilscienceeditors.org*).

on site concepts, architecture, and development. The CSE Board reviewed and advised on major milestones from start to finish, and Resource Center staff were instrumental in planning and execution of the project.

Through autumn and winter 2013, each CSE committee thoroughly reviewed site content related to their committee charges, refreshing text and developing new content where necessary. Meanwhile, the Web Committee reviewed and updated all remaining pages and worked closely with Windmill on site concepts and architecture. The committee also researched and prepared search-engine optimization documents to ensure discoverability of the site and its content. Informed by the primary desktop site, responsive designs were created for tablet and smartphone platforms, so you can now easily read CSE's "White Paper on Promoting Integrity in Scientific Journal Publications" or news about upcoming events on your smartphone.

The new site's home page (Figure 3) is organized to highlight the most popular content and give members quick and easy access to all areas of the site. There's some great new content that is worth check-

ing out, such as a page of Retraction Resources put together by the Editorial Policy Committee, guidelines for research projects for the Publication Management Certificate Program, and an expanded history of CSE. The Web Committee encourages you to visit the new site at *www. councilscienceeditors.org* and tell us what you think by e-mailing *info@councilscienceeditors.org*. We encourage and appreciate any and all comments that will help to keep the new CSE Web site a prime destination and resource for the scientific-publishing community for years to come.

With a new Marketing Committee, a new style guide, a new logo, and a new Web site, the Council of Science Editors embarks on a new era with an updated look and feel and with the ability to reach out more effectively to members and prospective members. We thank all the CSE volunteers who spent countless hours reviewing, editing, organizing, and writing. At first, the tasks seemed amorphous and impossible to complete on time—but they were all completed on time and on budget! We also thank Windmill Design for being a great partner and the Resource Center Associates, now the Kellen Company, for its support.

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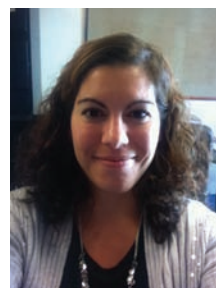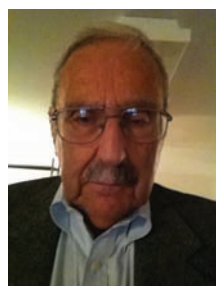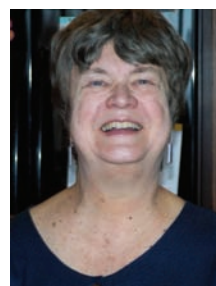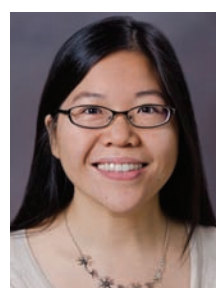
Calendar

2014

8 October
BELS (Board of Editors in the Life Sciences) examination. Memphis, Tennessee. Registration deadline is 17 September. *www.bels.org.*

8–11 October
American Medical Writers Association annual meeting. Memphis, Tennessee. *www.amwa.org.*

30 October–1 November
Mediterranean Editors and Translators meeting. Madrid, Spain. *www.metmeetings.org.*

5–8 November
American Translators Association annual conference & exhibition. Chicago, Illinois. *www.atanet.org.*

6–7 November
Association of American Medical Colleges annual meeting. Chicago, Illinois. *www.aamc.org.*

6–8 November
European Medical Writers Association conference. Florence, Italy. *www.emwa.org.*

7–8 November
American Association of Dental Editors annual conference. San Antonio, Texas. *www.dentaleditors.org.*

2015

12–16 February
American Association for the Advancement of Science annual meeting. San Jose, California. *www.aaas.org.*

5–8 April
Association of Clinical Research Professionals annual conference. Salt Lake City, Utah. *www.acrpnet.org.*

30 April–1 May
American Society for Indexing annual conference. Seattle, Washington. *www.asindexing.org.*

15–18 May
Council of Science Editors annual meeting. Philadelphia, Pennsylvania. *www.CouncilScienceEditors.org.*

16 May
BELS (Board of Editors in the Life Sciences) examination. Philadelphia, Pennsylvania. Registration deadline is 25 April. *www.bels.org.*

Information for Contributors

- *Science Editor* welcomes contributions on research on peer review, editorial processes, and ethics and other items of interest to the journal's readers.
- Please submit manuscripts as e-mail attachments and include the author's contact information.
- Submit material in the style recommended by *Scientific Style and Format*, with references in the order of citation.
- Submitted materials are subject to editing by the appropriate editors and copyeditor.

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