

# Careers in Science Editing: An Overview to Use or Share

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A medical editor once wrote, “Children dream of growing up to be doctors, lawyers, teachers, or firefighters—but some of them end up, quite happily, as editors.”<sup>1</sup> For those of us drawn to both science and communication, a career in science editing can be an especially happy match. What niches exist in science editing? How can one find them? Where can one obtain further information on science-editing careers? This article and the accompanying sidebar address those questions. We hope they will help readers who are thinking of entering science editing or of changing niches within the field. We also hope they will serve as resources for established editors and others when asked about career options.

### Niches in Science Editing

Science-editing positions exist at journals, in book publishing, in the popular media, and more. Summarized below are some of the main niches.

#### Journals

Positions at scientific journals commonly include those of editor-in-chief, managing editor, and manuscript editor. Among other positions at some journals are those of production editor, news editor, and online editor. The number and variety of editorial positions depend largely on the size of the journal and the frequency of publication. A small journal published a few times a year may be staffed by a few part-time volunteers. In contrast, large weekly journals have sizable, highly differentiated full-time staffs.

Whatever the size of a journal, it will have an *editor-in-chief*, sometimes termed merely *editor*. Such a person is responsible

primarily for the content of the journal. That responsibility includes choosing peer reviewers and deciding which manuscripts to accept. Depending on the operating structure of the journal, such duties may be shared with fellow editors—who bear such titles as *deputy editor*, *associate editor*, or *assistant editor*—or with members of an editorial board. The editors responsible for scientific content are sometimes termed *scientific editors*.

Typically, the editor-in-chief and other scientific editors are researchers and stay active in science while serving as editors. For instance, Ana Marusic, one of two editors-in-chief of the *Croatian Medical Journal*, spends most of her time as an anatomy professor. William S Modi, an associate editor of the *Journal of Heredity*, is a genetics researcher at the Center for Conservation and Reproduction of Endangered Species. In his volunteer capacity as an editor, he has the main tasks of distributing manuscripts to peer reviewers, following up on reviewers, and editing manuscripts for scientific accuracy, length, and grammar.

Often, outstanding peer reviewers are tapped as assistant editors or associate editors. Those showing particular editorial acumen and interest may then progress to editor-in-chief.

Sometimes, an editor-in-chief oversees more than one journal. For example, as the American Physical Society editor-in-chief, physicist Martin Blume was responsible for the society’s various journals from 1997 to 2007. He notes that his activities included managing production and content of the journals; overseeing online publications; planning and running workshops, meetings, and symposia for the society; and acting as part of the society’s governing body.

*Managing editors* are responsible largely for administrative aspects of journals. Polyxeni (Poly) Potter, managing senior editor of *Emerging Infectious Diseases*, assumed this role when the journal was

founded in the middle 1990s; her responsibilities have evolved as the journal has developed. They focus on “management of publishing operations and communication efforts”, Potter says. She implements and updates processes and systems to publish the journal, administer its offices, communicate its content, and increase its impact. And she is responsible for developing goals and standards for staffing, operations, and budget activities. Managing editors come from a variety of educational backgrounds. Good organizational skills are crucial to success in this role.

Once papers are accepted, *manuscript editors* edit them. Goals of the editing include clarity, conciseness, consistency with the journal’s style and format, and correctness of grammar, spelling, punctuation, and usage. Manuscript editors also check for logic and consistency. When they encounter inconsistencies or ambiguities, they query (pose written questions to) the authors. In addition to refining text, they work to improve tables and figures. When nonnative speakers of English publish papers in English-language journals, manuscript editors at the journals can face particular challenges and be of particular service.

Manuscript editors for journals come from varied academic backgrounds. Some have undergraduate or graduate degrees in science; others majored in English, journalism, or other fields. Although a few have taken university courses in science editing, most get their editorial training largely on the job.

Editing of journal manuscripts can occur in an editorial office or elsewhere. In some cases, manuscript editors work in the journal’s editorial office with those in other editorial roles; some organizations that publish multiple journals have a central manuscript-editing office. Other journals outsource manuscript editing to the company that prints the journal or elsewhere. Some journals use freelance manuscript

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SHAUNA KANEL worked on this article while a Science Editor intern. BARBARA GASTEL is the editor of Science Editor.

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editors, either exclusively or to supplement the work of in-house staff. Once they have worked on site and become well versed in the journal's requirements, some manuscript editors telecommute at least part of the time.

Another role at some journals is that of *production editor*. At the American Society for Microbiology, production editors “shepherd manuscripts from submission through publication”, says Becky Zwadyk, production editor for one of the society's journals, *Molecular and Cellular Biology*. Zwadyk notes that when a manuscript arrives, a production editor assigns it to a scientific editor according to its topic. Once a paper is accepted, duties include scheduling it for publication, providing guidance for manuscript editors, and overseeing correction of proofs. “We are the point of contact for the printer . . . and for other service providers, such as those . . . involved in posting accepted manuscripts online in advance of publication,” Zwadyk says. “We are [also] the authors' point of contact throughout the process.”

Some journals have news sections and thus need *news editors*. These editors assign stories rather than evaluating papers submitted at authors' initiative. Truman J Milling Jr, editor of the News and Perspective Section of *Annals of Emergency Medicine*, helps to develop story ideas, assigns stories to writers, edits the stories, writes headlines, and otherwise runs the news section. As news editor, Milling, who was a journalist before he attended medical school, draws on his continuing work as an emergency physician.

As their electronic presence has grown, more and more journals and related publications have added *Web editors* or *online editors*. Stewart Wills, online editor of the *Science* Web site, and David Grimm, online editor of *Science's* news magazine *ScienceNOW*, do everything from writing copy and programming for the site to editing the work of staff members and freelancers and designing interactive environments that feature podcasts, blogs, polls, links, audio, and video. Both Wills and Grimm warn of the demands of such positions.

Says Wills: “The job can, if not properly handled, bring out the workaholic in some people, since there's much more to do than can fit into an 8-hour day.” That caveat may also apply to other posts at journals.

### Books

Opportunities in editing scientific books exist at university presses, commercial scholarly publishers, scientific organizations with book-publishing programs, and elsewhere. Roles include acquiring manuscripts, coordinating their conversion to books, and editing manuscripts.

*Acquisitions editors* acquire manuscripts in two main ways: by receiving unsolicited proposals from prospective authors and by initiating ideas for books. In the latter case, the acquisitions editor identifies book topics that would suit the publisher. He or she then finds suitable authors and makes sure that they complete the manuscripts on time and in satisfactory form. Such a job “allows for a fair amount of freedom and creativity”, says Kevin J Downing, senior acquisitions editor at Greenwood Press, who comes up with many project ideas.

Many acquisitions editors in the sciences have degrees in the fields in which they acquire books. They also read journals and attend conferences in those fields. Such background and exposure help in finding suitable topics and authors, choosing peer reviewers of book proposals and manuscripts, and making decisions about publication.

Once a book manuscript is accepted, a *production editor* or *project editor* ushers the book through the production process. That role can include coordinating manuscript editing, artwork processing, book design, indexing, printing, proofreading, and other activities for multiple books at once. Attention to detail—even compulsiveness—can be an asset in this regard, says Jennifer Ann Hobson, project editor at the Texas A&M University Press.

Manuscripts for books, like those for journal articles, undergo editing. The editing commonly is done on a freelance basis rather than in house. The larger scope of the project poses additional challenges but

can provide additional rewards. Publishers of science books often seek to assign book manuscripts to editors who have expertise in the subject matter, so a science background can be a strong asset.

### Popular Media

Science-editing opportunities in the popular media may be most common at magazines. Such positions also exist in the broadcast media, at newspapers, and for Web sites.

Magazines sold on the newsstand and those published by institutions hire editors in the sciences. Editorial roles include content acquisition, publication management, and manuscript editing.

When asked about her motivation for working as executive editor of *Scientific American*, Mariette DiChristina says, “It's just plain fun to make a magazine.” For top editors at a science magazine like DiChristina and David Harris, editor-in-chief of *symmetry* magazine (published by Fermi National Accelerator Laboratory and Stanford Linear Accelerator Center), “being an editor means being involved in every aspect of the production of a magazine,” Harris says.

At some magazines, top editors hold monthly, weekly, or daily planning meetings to help ensure that stories and staff members—including writers, editors, researchers, and graphic designers—are on track. Such editors may develop story ideas, determine the mix of articles, oversee logistics in house and with freelancers, do some editing of stories, and check the quality of the product before it is delivered to the public.

Some top editors add a little of their own writing to the issue, but most trade the satisfaction of writing for that of knowing, as DiChristina puts it, that they “make an intelligent contribution to the available information and public discussion about science”. Ivan Amato, managing editor of *Chemical & Engineering News*, says anyone thinking of moving from a writing role to the top echelons of a magazine must be willing to make this trade-off.

Some editorial posts at magazines are

flexible in scope. “The job is what you want it to be,” says Linda Wang, an associate editor at *Chemical & Engineering News*. “Play up your strengths.” Wang, who enjoys photography, has managed to incorporate her hobby into her job: her photos have appeared throughout the magazine, including on the cover.

At science magazines, other work by people with editorial titles can include editing stories by staff members or freelance writers and doing some writing themselves (for example, covering scientific conferences). Although the question remains unanswered, some editors at science magazines prefer a science background to one in journalism. “I firmly believe it’s easier to teach a scientist how to write well than to teach a journalist the nuances of the scientific method,” says J. Kelly Beatty, executive editor of *Sky & Telescope*.

Interpersonal skills and willingness to work on a team also can be factors in hiring for editorial posts at magazines. “This is the sort of job in which you have to be willing, comfortable, and eager to speak with any other member of the staff, all the way up or down from you on the masthead,” Amato says.

National Public Radio (NPR) employs science editors, who work on both daily science coverage and the program “Science Friday”. In addition to performing tasks like those of print editors, such as developing ideas and supervising projects, science editors at NPR must consider such aspects as sound quality and dialogue clarity.<sup>2</sup>

Science editors for television must also consider visual aspects, such as the quality of images, the relationship of text and image, visual pacing and flow, and compliance with visual conventions of the genre.<sup>3</sup> Opportunities in television science editing include those at television stations and at production companies that produce documentaries.

Few newspapers have editors that focus only on science. However, such editors do exist at large newspapers with sizable science-reporting staffs. News syndicates, such as the Associated Press, also have science editors.

## Exploring Science Editing: Some Resources

Below are some resources that can, directly or indirectly, aid in exploring science editing as a career. In addition to providing information themselves, some introduce other resources.

### Organizations

- Council of Science Editors ([www.CouncilScienceEditors.org](http://www.CouncilScienceEditors.org)).
- European Association of Science Editors ([www.ease.org.uk](http://www.ease.org.uk)).
- Association of Earth Science Editors ([www.aese.org](http://www.aese.org)).
- World Association of Medical Editors ([www.wame.org](http://www.wame.org)).
- American Medical Writers Association ([www.amwa.org](http://www.amwa.org)).
- National Association of Science Writers ([www.nasw.org](http://www.nasw.org)).
- Society for Scholarly Publishing ([www.sspnet.org](http://www.sspnet.org)).
- Society for Technical Communication ([www.stc.org](http://www.stc.org)).

### Directories of Educational Programs

- Society for Technical Communication Academic Programs Database ([www.stc.org/academic/index.aspx](http://www.stc.org/academic/index.aspx)).
- Directory of Science Communication Courses and Programs ([www.journalism.wisc.edu/dsc](http://www.journalism.wisc.edu/dsc)).

### Style Manuals

- *Scientific style and format: the CSE manual for authors, editors, and publishers*. 7th ed. Council of Science Editors, Style Manual Committee. Reston (VA): The Council; 2006.
- *AMA manual of style: a guide for authors and editors*. 10th ed. Iverson C et al. New York (NY): Oxford University Press; 2007.

### Booklet

Meyers B. Explore the world of professional & scholarly publishing. Professional and Scholarly Publishing Division, Association of American Publishers; 2002 ([www.pspcentral.org/index.cfm?left=publications&page=/home/publications.cfm](http://www.pspcentral.org/index.cfm?left=publications&page=/home/publications.cfm)).

### Panel Presentation

Gatekeepers, midwives, and wordsmiths: career options in science editing. American Association for the Advancement of Science annual meeting, Boston, 15 February 2008, 4:00-5:30 PM ([www.aaas.org/meetings](http://www.aaas.org/meetings)).

Of course, science sites on the World Wide Web have call for editors. And the call seems likely to continue to increase. Scientific knowledge, editorial ability, and the requisite technical skills seem likely to remain a winning combination.

### Author’s Editing

Author’s editors in the sciences edit papers, proposals, and other writing by scientists before submission. Some work for research

institutions or components thereof; others are employed by editing services or freelance individually. Author’s editors adept in English can find work in many countries.

As an institutional author’s editor, David Armbruster, head of scientific editing and library communications at the University of Tennessee Health Science Center, edits journal articles and grant proposals for science faculty and clinical faculty, post-

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doctoral fellows, and graduate students. He also edits institutional documents, such as the faculty handbook, and library communications (printed and electronic). Like some other editors working for educational institutions, he also has other professional roles that require him to juggle his time and focus.

Freelance author's editors also can face the challenge of wearing many hats. "I am a travel agent, secretary, computer tech, accountant, research assistant, and graphic artist," says Tom Lang, of Tom Lang Communications and Training.

Whether an author's editor is institutionally based or freelance, networking can be important in attracting authors. As to the preferable academic background, "the question of whether scientific author's editors should have a humanities or science background has been argued for many, many years and will never be satisfactorily answered," says Armbruster, who has a humanities background.

For freelance author's editors, attractions can include the ability to work from home, the freedom to choose what assignments to accept, and opportunities to travel. However, according to Kristen King—a freelance author's editor, copywriter, and consultant—the biggest satisfaction of editing is "helping [people] express their ideas in such a way that others can understand them clearly and appreciate them". Aiding researchers in communicating their work can be highly rewarding for an author's editor in the sciences.

### Other Institutional Settings

Jobs for science editors exist not only in academe but in other institutional settings, such as corporations and government. For example, pharmaceutical companies and software developers often employ scientific or technical editors. At such corporations, editorial decisions can reflect marketing objectives.

While a technical writer and editor for StataCorp LP, Gabe Waggoner, now a freelance science editor, edited manuscripts for the company's quarterly journal and books for the Stata Press. He also edited "untold

pages of technical-manual copy", book reviews, and even FAQs. In addition, he was "the go-to guy for grammar and usage questions".

Kelley Hill, a medical writer and senior medical editor at Millennium Pharmaceuticals, Inc, writes and performs quality control for such documents as clinical-study protocols and reports, investigator's brochures, and briefing books for Food and Drug Administration meetings. She notes that the quality-control work "extends to PowerPoint slide decks and some publications and posters for scientific meetings" and to documents circulated internally for decision-making. "I love working collaboratively on all projects," she says.

Science editors also hold positions at various government units concerned with science and technology. Items edited vary widely: journal articles and journals, technical reports, articles, brochures, and online material for the public.

Editing a government publication can bring both constraints and freedoms. Harris, editor-in-chief of *symmetry* (published jointly by two US Department of Energy laboratories), says that "although we have an incredible amount of freedom, there are times when we simply can't take a pure journalistic approach to a topic." On the other hand, he notes, "as a government publication we are not allowed to accept advertising. That provides freedom to use the space in a magazine in creative ways."

Meticulous, knowledgeable editing can be especially important for government publications that have long shelf-lives or are used to instruct government employees or the public. For Marilyn A Billone, writer-editor at the US Geological Survey (USGS)-Reston Publishing Service Center, "knowing that my editing . . . substantially contribute[s] to producing high-quality USGS information products that are made available to our customers—most important, our taxpayers" is a major source of pride.

Marg Rutka, a geoscience editor at the Ontario Geological Survey in Canada, echoes that sentiment. Editing material

for accuracy, she notes, is a top priority. Her organization, she says, hires only those showing strong geoscientific knowledge, preferably with training in the field.

### Other Niches

Wherever science is written about, opportunity exists for science editing—and thus employment for science editors may exist.

For example, the (US) National Academies (comprising the National Academy of Sciences, the National Academy of Engineering, the Institute of Medicine, and the National Research Council) issues 250 to 300 reports a year, mostly on subjects on which parts of the federal government have requested advice. Norman Grossblatt, senior editor at the National Academies, edits "material on a huge variety of subjects, mostly related in some way to the life sciences". He took the National Academies job after working initially in engineering editing, "and I'm still in that job 44 years later."

Hugh E McDonald is a senior science writer-project director at the Exploratorium, a hands-on science museum in San Francisco. "My primary activity at the Exploratorium is editing text written by exhibit developers, scientists, artists, and other staff," he says. Sometimes, he also writes—for instance, for the Exploratorium's newsletter or Web site. The main challenge, he says, can be editing or writing to suit the varied audience—which can include children and adults, scientists and nonscientists, non-English-speaking visitors, and funders of projects.

Stephen D Johnson works in a very different setting: the American Board of Internal Medicine, which certifies physicians practicing internal medicine and its subspecialties. His role as examination editor includes coordinating development of test questions, coordinating production of certifying and recertifying examinations, and supervising copyeditors and graphics editors. Johnson recommends that those in positions like his have experience in medical editing, familiarity with the test-development process (and preferably some

background in psychometrics), and the ability to work effectively with committees of physicians or other content specialists, with other editors, and with production staff.

### Finding Science-Editing Positions

Ways to find science-editing jobs include networking, job announcements, internships, formal instruction, and some combination thereof. "Editors can enter the field through various doors, which helps to make the profession diverse and interesting," Armbruster observes.

Network, network, network. Attend meetings of the Council of Science Editors and other relevant organizations (see sidebar for some possibilities); if local chapters exist, participate. Contribute to e-mail lists. If an editorial office that interests you lacks an opening, consider requesting an informational interview. Talk with people who are doing work of types you think you might enjoy. Make it widely known what sort of post you are seeking; an acquaintance of an acquaintance may well have a productive lead.

Look for announcements of job openings for science editors. Traditionally, such announcements have appeared as classified advertisements, for example, in scientific journals, major newspapers, and organizations' newsletters. They are increasingly appearing online. Prime sources include the job postings on the CSE Web site, [www.CouncilScienceEditors.org](http://www.CouncilScienceEditors.org). The CSE job postings are openly accessible, and anyone interested can register online to be

notified by e-mail when new job announcements are posted. Also, be alert for job announcements in other venues, such as on bulletin boards at conferences.


Consider doing an internship in science editing or a related field, such as science writing. Many science publications offer internships; so do the editorial offices of some institutions. If a site where you might like to be an intern lacks a formal internship program, ask about pursuing an ad hoc internship. Resources for finding internships include the internship fair held by the National Association of Science Writers in conjunction with the American Association for the Advancement of Science (AAAS) annual meeting. Also, the AAAS Mass Media Science & Engineering Fellows program places graduate and postgraduate science, engineering, and mathematics students in 10-week summer internships.<sup>4</sup>

Formal instruction can provide knowledge, skills, and contacts useful in obtaining a science-editing position. Such instruction can range from a half-day workshop at a conference to a graduate program in technical writing or science communication. Efficient sources of instruction include the CSE short courses, which run for 1 to 2 days preceding the CSE annual meeting each May.

When deciding which positions to apply for, don't go only by job titles; look at job descriptions. In one setting, someone termed "assistant editor" may have substantial responsibility for content; in another, a person with the same title may

do largely clerical work. Read job descriptions carefully, ask questions about duties when interviewed, and if it is feasible, talk with others who have worked in the same role for the same employer.

If you are trying to break into science editing, consider taking an entry-level position and working your way up. Many in editing and publishing have started as editorial assistants or the equivalent. Such a position can let one learn the workings of the editorial office, demonstrate a strong work ethic and other desirable traits, fill in at editorial tasks when opportunities arise, and become well positioned to move up.

Whatever path one takes, science editing can be a fine career for those interested in science and communication. Satisfactions can include learning continually about science, applying verbal and interpersonal and other skills, and helping people and society. We might not have dreamed of growing up to be science editors, but some of us can hardly imagine doing anything else. 

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