

The Importance of Technical Publications

Harry Levinson

Editor-in-Chief

The transition to online publishing has led to the introduction of new formats for communicating technical information. Video recordings of conference presentations are now available in repositories such as the SPIE Digital Library, a development that gained impetus when conferences could not be held face to face. However, there are several important characteristics of technical papers written in conventional formats that are not found with recorded presentations. To readers of *JM³* this may seem apparent. After all, you are reading this journal because you see value in technical publications written in long-established formats. Nevertheless, I am writing about this subject because I think it important to enumerate explicitly some of the reasons that technical publications have value that cannot be provided by means of other forms of communication.

An important characteristic of technical publications is that they are written. While this is, in a sense, tautological, written documents have some important attributes that are of particular value to technologists. One of these is specificity. For example, suppose one wants to know the wavelength at which EUV lithography is practiced. A search of the literature will reveal that many different wavelengths were used in the early days of EUV lithography research, and at some point in time a wavelength of $\lambda = 13.5$ nm was adopted. For those who have need of precision, a more exact value of $\lambda = 13.53$ nm for the centroid wavelength can be found in recent publications, while the precise definition of centroid wavelength can be found in published standards and books. Not only are specific numbers given for the wavelengths, but the system of technical publications automatically provides a time stamp for the information. This type of specific and dated information is conveyed and retrieved much more efficiently in writing than by using other formats, such as videos.

This is not to say that videos of presentations are without merit. There is most certainly value in seeing and hearing authors present their work, and archived videos are useful for people who were unable to attend a conference in person. However, such presentations are of greatest value when they are used to help people in the audience avoid being “unable to see the forest for the trees.” We can be introduced to a subject by means of a conference presentation, and the proceedings paper can then provide us with a higher level of detail. Even more information can be found in papers published in peer-reviewed journals such as *JM³*, where more detail is expected than for proceedings papers, and readers benefit further from improvements resulting from the review process. Videos have become parts of publications in peer-reviewed journals. For example, the use of video formats can be useful when measurements or modeling of dynamic processes are involved, but such videos are supplements to the written papers, not replacements.

Another important aspect of written papers, in contrast to recorded presentations, is the ability of readers to set the pace for absorbing information. Certainly one can stop videos and rewind them to go over some material a second time, but this is an interruption involving multiple actions. It is a very small matter to reread a sentence or paragraph. The difference is even greater when you find yourself wanting to check on something several slides back in a presentation. Finding the desired point in the presentation often takes so much time that people watching videos often don't go back to confirm what they had seen and heard. Returning to a paragraph on a prior page is much more straightforward.

There is a quality aspect, as well. Even the best speakers, who practice their presentations multiple times before presenting to an audience, will have spots in their presentations where they forget to mention an important point or say something unclearly. The purpose of proofreading papers is to eliminate such problems in papers that eventually are published. For papers submitted to peer-reviewed journals, there is an additional level of quality control.

Time constraints are another issue, particularly for videos that are recorded live at conferences. For the lithography conferences sponsored by SPIE, most presentations are 20 minutes in length, including the time for questions and answers. This amount of time is usually quite adequate for authors to convey key messages, but it doesn't permit the communication of a high level of technical detail. At conferences, it is important for speakers to use fonts sufficiently large to be readable by people sitting in the back of the auditorium. This precludes presentation of anything with a high density of information, notably complex equations. Conveying detail embedded in mathematics necessarily requires writing. Although journal articles and proceedings papers can contain significant content, this is done in an efficient way; Portable Document Format (PDF) files are much smaller than video recordings of presentations, a characteristic which is advantageous for researchers who find it convenient to have copies of technical papers readily available on the internal storage drives of their computers.

References are another important component of technical publications. In a presentation, speakers often include their sources of graphs or figures when they have obtained them from someone else, and good speakers acknowledge prior work when their current work is derivative. However, the number and range of references must be lower in presentations, simply due to time constraints. Important references not found on presentation slides can often be found in proceedings papers, while the list of references is typically even more extensive in papers published in *JM³*. A list of references is an important resource for someone wanting to study a subject in depth.

Written papers are also far more likely to be referenced. This occurs in part because written papers are more likely to be known. While recorded presentations can be found during a literature search if words used in presentation titles are included as search parameters, information internal to written papers is also used by search engines, increasing the likelihood that a written paper will be identified. Moreover, non-written forms of information are typically not indexed in various databases of published technical papers, further decreasing their visibility.

As a final point, it should be noted that the sharing of technical information has been a notable characteristic of the semiconductor electronics industry, and the advances in our industry over the past half-century are unprecedented. These advances and the sharing of information are not coincidental. Communicating information is important, and technical publications provide such information in key ways that cannot be provided by recordings of presentations at conferences.