

Editorial

Write Right for ICAE

ICAE (Integrated Computer-Aided Engineering), having achieved a prominent status as a high-impact journal that promotes interdisciplinary research using cutting-edge computing technologies, is approaching its 30th anniversary. While there is much to celebrate, it is also time to look back on what ICAE has done right and reaffirm that ICAE's good practice will continue. Meanwhile, we as readers, authors, and reviewers are encouraged to take this opportunity to think about what we can do to help make ICAE even stronger moving forward.

For any organized endeavor to be influential and successful, it needs a visionary leader. Prof. Hojjat Adeli, founder of ICAE and its long-time editor-in-chief since its inauguration, put forward a profound vision some 30 years ago that ICAE shall only publish papers of the highest quality – papers that present innovative solutions to complex engineering problems, that integrate leading edge and emerging computer and information technologies, and that are, on top of these, well written. With this vision has come ICAE's mission to foster interdisciplinary research projects and open new frontiers that lead to breakthroughs.

The primary criterion for acceptance by ICAE is computational originality and methodological contributions, which is guarded by rigorous reviews. Eminent and high-achieving researchers in their fields are recruited to review submissions and provide accurate, constructive, and unbiased opinions to their authors. Each submission is scrutinized by five reviewers, ranging from the significance of its contributions and the exposition of its results to the correctness of its methods and the appropriateness of its data, among other things. Multiple rounds of reviews may be warranted before an acceptance decision is made on a submission.

This differs from publishing in a peer-refereed conference proceedings, which typically has a short production cycle of six months or less from submission to publication. However, the quality of a conference paper may be hindered by the following factors:

- (1) Stringent page limitations and firm submission deadlines are often imposed on conference papers, and so authors have less space and time to elaborate ideas or write up technical details.
- (2) Conference papers are judged by a program committee, who serve as referees to decide whether to accept a submission. Each committee member reads a good number of papers in a short period of time, sometimes assisted by external sub-reviewers. While it might be sufficient to judge appropriately in a small time frame, it would be difficult for a committee member to think through every aspect of an accepted paper and provide well-thought suggestions for improvement.
- (3) A short production cycle of conference publications also means that authors of accepted papers may not have enough time to respond thoroughly to the suggestions of the program committee.

Worse would be a conference paper inappropriately treated as a final product. Some authors don't make conference papers into a journal publication. "I have published my results in a refereed conference and I have received the credits, which are good enough for me," so they say.

Researchers attend a conference for inspirations and networking by listening to talks, asking speakers questions, exchanging ideas, seeing different viewpoints, and chatting during coffee breaks. Conference papers, serving as a credential check for speakers, are a means to strengthen these activities. A program committee's primary job is to ensure that speakers meet a certain standard: You earn a ticket to speak if your paper is accepted. Thus, a conference paper is never meant to be the final form of a scholarly publication. Rather, it should be treated as a preliminary report, and a polished extended journal publication is expected to come after. Unfortunately, this practice has not been strictly followed.

Consequently, students may sometimes have to learn from unpolished conference papers, which might give them a wrong impression that it is what a research paper would be like, and they may just follow suit without knowing the right way. We as authors, reviewers, and educators can make a difference here. We bear the responsibilities for ensuring that research findings be presented with a lucid exposition. Going through a rigorous reviewing process for a journal publication will serve this purpose.

To extend a conference paper, some journals require at least 30% extra original findings. Others require more. ICAE strictly follows the 50% rule. That is, you must include at least 50% additional results on top of those in your conference paper, and more is preferred. Adding additional literature review, introductory materials, or examples doesn't count toward meeting this requirement. This means that you must maintain a fruitful ongoing research program after your conference submission.

It is true that the production cycle of a journal is longer, but it doesn't have to be much longer than that of a conference. If your results are publishable, then a delayed publication is often due to poor exposition or missing elements. Thus, one way to shorten a production cycle is to write a paper the right way in the first place, so that acceptance decision can be made in the first round of reviews.

To write in the right way you must keep your readers in mind. A research paper is not just reporting new findings, it is also a means to pass on new knowledge and so it should be comprehensible. Thus, you must understand your readers, as well as your reviewers, so that you can better determine what levels of technical details are appropriate. In a nutshell, a paper should be written according to the following guiding principle: Present your ideas and results with adequate technical details such that an expert can comfortably follow without feeling bored or annoyed, and a doctoral student can manage to follow without feeling embarrassed or frustrated.

Readers of ICAE are of the same kinds as those who read academic journals and conference proceedings. They are either well-versed on the same subject of your paper, or not as well-versed but interested in learning your research, or just checking a few things in your paper. ICAE only uses experts in the subject area of your research as reviewers, but they may not have worked on the same problems. With these understandings, you should include, but not limited to, the following elements in your paper, which are also what the reviewers will most likely be looking for:

(1) Provide a big picture. Inexperienced researchers, while having less difficulties writing about the technical part, for that is what they have been doing, often find it hard to present a big picture of their research. Even if they begin with a perfect plan, things may have evolved and focuses may have shifted during the course of the project. Now is the time to rethink hard about the depth and breadth of what you have achieved, and summarize what your major contributions really are. In particular, you should step back from tedious technical details and ask yourself the following questions:

- Why is my research interesting? Does it have good applications?
- What are the state of the art and the main obstacles of the research problems I have worked on?
- Why are my results worth publishing? Have I come up with a new approach, perfected an existing method, or both?
- How should I validate my results? Are the data sets I used in my experiments appropriate?
- What are the strengths and weaknesses of my methods?

Figuring out satisfactory answers to these questions as objectively as possible, you will be poised to present a holistic view of your work, and, omitting technical details, compose the section of introduction, which is often the most difficult section to write well. Describe objectively what your major contributions are in this section. Adding details to the answers to these questions will then become various sections, which typically include related works, a detailed decryption of your methods, validation, conclusion, and references.

(2) Compose an adequate abstract and a title. Your abstract should include a concise description of the problems you worked on, the methods you developed, and the results you obtained, both theoretical and experimental. This may take a few back-and-forths until you have come up with a satisfactory abstract. You may then focus on using one sentence to describe what your paper is really about and draw up a catchy title. Avoid long titles if at all possible. Do not reuse sentences between the abstract and the introduction, for doing so shows sloppiness and gives the reader a bad taste.

- (3) Summarize related works. Do not simply cascade related prior publications. Rather, group them according to problems they solve or methods they use. Do not just copy a portion of the abstract in a cited paper, rather, use your own words to describe the methods and results that are most relevant to your work. You should also point out their weaknesses, which can help you set up your approach.
- (4) Describe your technical contributions with appropriate details. Pay attention to logical connections of each step to the next and minimize abruptness that may cause your reader to pause. Do not present concepts commonly known in the field as formal definitions as if they are new. Do not include straightforward math. Instead, present a few key formulas or equations as check points so that readers may fill in the details in-between without much difficulty. How much math should be presented is a judgment call based on the guiding principle aforementioned, and you will have a better idea when you publish more. Be consistent with your math notations. Functions and variables should be slanted times new roman such as $f(x)$; numbers, parenthesis, and standard functions should be upright such as $\sin(x)$, $\log_2 y$, and $\max\{9, x\}$; vectors and matrices should be slanted boldface such as \mathbf{v} and \mathbf{A} . When in doubt, check a published ICAE paper for samples of correctly-typeset symbols and equations. To present an algorithm, it is always a good idea to describe it in English with appropriate math, with or without additional pseudocode.
- (5) Explain your figures and tables. Point out the main points of each figure and table you want the reader to pay attention to. You have failed your readers if they have to guess what these points are. While a figure may be worth a thousand words, on benchmark comparisons, a table showing exact numerical values would be better than a figure showing trends, because developing new methods in the future would need exact references to compare with.
- (6) Validate your methods. Validation is often done by math, experiments, or both. If your methods involve parameters of empirical values, then you should probably include a sensitivity analysis by slightly increasing or decreasing the values. Explain what your experimental results mean.
- (7) Cite relevant references. Wherever possible, cite references related to your work and give credits

to their authors. Sometimes a reference is not directly related, but is on the same general topic and so the reader may think it is relevant. To avoid confusion, you may still cite it but should also point out the differences.

- (8) Pay sufficient attention to conclusion. It is often the last section you write, but it is as important as the abstract, and so it deserves the same amount of your time and effort to write it well. Do not just recycle your abstract. Point out the strengths and weaknesses of your methods, even if you have already done so in previous sections. Suggest a few directions for future work. These directions should be well thought-out in the sense that they are not only interesting but also possibly doable.

These elements should be included in any research paper you write, for a journal or for a conference. The only difference would be the level of details.

Publishing in ICAE is not a contest. You have the time and space to do it right. Authors whose native language is not English should avoid using a complex sentence to express multiple ideas. It takes effort even for an experienced writer with a good command of English. Instead, write a sentence to express only one idea. You have failed your readers if they have difficulties parsing your sentence or have to guess what you want to say. When in doubt, try to parse it yourself and you may then know how to rewrite it. When in doubt about the correct form of a certain phrase you would like to use, you may search for its correct usage online. For example, to find out whether it should be “responsible for” or “responsible of”, just enter either one of them on your search engine. When you don’t know how to say certain things in English, enter what you want to say in your native language on your search engine for a possible English counterpart. Finally, check your spelling throughout the paper using a good spelling checker.

Mandated by ICAE, you would need to write in third person. Do not use a cited reference as a subject or an object. For example, do not convert “We showed that the problem is NP-hard [1]” to “[1] showed that the problem is NP-hard”. This is awful, and outright wrong when citations are written as superscripts as some printing styles do. Instead, you may write “It was shown that the problem is NP-hard [1].” For another example, do not write “[2] showed that the method presented in [1] is not applicable.” Instead, you may write “Smith [2] showed that the method presented by Jones [1] is not applicable.”

Publishing a paper in ICAE is a rewarding process. It gives you a deeper sense of accomplishments. You

may have to do more work to meet the high standard of ICAE, but it is well worth the effort. Its rigorous review process provokes you to think deeper and broader, makes you write better, and pushes you to reach your best intellectual capacity. The end result comes a paper that is nearly flawless, a paper that better conveys your ideas, techniques, and findings to your readers, a paper that adds to the success of the journal, and above all a paper that you could still feel good about in many years to come. It is like an artist who has produced a masterpiece and a figure skater who has performed a perfect quadruple flip. So I would like to encourage you my fellow researchers, roll up your sleeves and write for ICAE!

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