U.S. ARMY MODEL AND SIMULATION OFFICE
PRIMER FOR DEVELOPMENT OF JOURNAL ARTICLES IN SIMULATION

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ABSTRACT

We offer a gentle introduction to issues surrounding publication in peer review archival journals.

1 INTRODUCTION

The primary mechanism for the communication of advancements in science and engineering is publication. Publication may be formal or informal. On the formal end of the spectrum are textbooks, journals, proceedings of conferences, symposia and workshops, and so forth. Informal publication includes email notes and posting results on the web. Each form of publication imposes different requirements on the technical author.

The purpose of this primer is to provide a gentle introduction to some of the issues surrounding publication in *peer review archival journals.* For further information on the policies, procedures and guidelines of particular journals, potential authors should refer to the journal's web site, or contact the journal's Editor-In-Chief (EIC).

2 WHAT IS PEER REVIEW?

Peer review deals with the manner in which an article is judged to be acceptable or unacceptable for publication in a particular forum. Most articles submitted for publication go through some sort of review. The degree of rigor in the review process varies greatly. When the reviewers of an article are chosen from the community of professionals whose research and publication areas match the article, this is considered *peer* review. Most journals enlist a peer review process. Some conferences do as well (for example, SIGGRAPH is peer reviewed, some tracks at Winter Simulation Conference are peer reviewed). Typically, the review process is *blind*. That is, the identities of the reviewers are unknown to the author(s). This enables the reviewers to provide open, honest commentary without exposure to any sort of personal or professional retribution. In some cases, e.g. the Parallel and Distributed Simulation (PADS) workshop, a *double blind* review process is used. In double blind review the identity of the reviewers is unknown to the author *and* the identity of the author is unknown to the reviewers.

3 HOW DOES PEER REVIEW WORK?

When you submit a paper for publication, the conference organizer or the journal editor sends your paper to (typically) 2 – 4 *referees* for review. Generally, the referees are selected because they have expertise in the area that your article is written in, and they will have published papers in the area as well. In this sense, therefore, they are your peers. These referees review your paper for suitability for publication according to the guidelines established by the conference or journal. Their primary job is to determine the *contribution* of your paper and, if the contribution is sufficient, they will recommend the paper be accepted and published. Generally, the referees include with their recommendation suggestions to improve the quality of the paper. In some cases, the referees stipulate that the changes are *required* to make the paper suitable for publication. In other cases, the referees leave the implementation of their suggestions to the discretion of the author. If a referee feels that the changes required to make the paper suitable for publication are too pervasive, or will take an inordinately long time to accomplish, the referee will recommend that the paper be rejected.

4 WHAT ARE SOME BASES FOR REJECTION?

Generally, articles are rejected for publication on the basis of insufficient contribution. For example, the primary research result given in the article may have been published elsewhere by a researcher unknown to the submitting author. Or, in some cases, the submitting author may have published an article elsewhere that is not sufficiently different from the article submitted. The later phenomenon is a result of pressures placed on some scientists (mainly academics) that relate quantities of published journal articles to professional advancement. Generally, the practice of "multi-publication" is not (and should not be) regarded as unscrupulous. For these scientists, it is merely part of the skill of being a good researcher to maximize the number of publications from a given body of research. The community of researchers in a given area, acting as peer reviewers, tends to establish and enforce well-understood criteria for uniqueness. Acts of unscrupulous plagiarism are obvious bases for rejection, of course, and are easily spotted during peer review.

Rarely is a paper rejected solely in terms of its readability. Generally, if the research contribution is judged to be worthy of publication, the editor of the journal will work with the author to bring the article up to readability standards.

5 SO, WHAT SHOULD I EXPECT FROM MY SUBMISSION?

If you submit an article to a simulation journal such as *ACM Transactions on Modeling and Computer Simulation (TOMACS)* or *SCS Simulation*, your paper will be received by the Editor-In-Chief (EIC) of the journal, and sent to an Area Editor (e.g. the Area Editor for Military Applications) for disposition. The Area Editor (AE) will be familiar with the area within which you are seeking to publish and will assign your paper to 2-4 referees. Generally, the referees will be published, knowledgeable, reputable scientists in the area you are writing in. The referees will be given 2-4 months to write a review, which they will submit to the AE. The AE accepts all the referee reports, crafts his/her own review, and writes a consolidated report and recommendation to the EIC, who makes the final determination. Generally, the recommendation will be to: (1) accept with minor changes, (2) prepare a major revision for second round of reviewing, or (3) reject.

In all cases, you will receive the Editor-In-Chief, Area Editor and referee reports. The identities of the EIC and AE will be known to you. Typically, the referees are anonymous. If you are asked to prepare a major revision, you will be given explicit guidance from the EIC and AE regarding your revisions. Typically, you will be given 2-4 months to submit your revised article and a *revision report*. The revision report identifies the changes you made to the article to meet the EIC and AE guidance, and/or explains why you believe one or more changes should not be made. The revised article is then sent back to the AE and the original referees. They will review the revised article and your revision report. Generally, if you have met the instructions given in the first round of refereeing, or provided compelling arguments why certain instructions could not be met, your article will be accepted. In some cases, further changes may be deemed necessary, but generally you will work directly with the EIC or AE to make the final minor changes in the manuscript.

Once your article has been accepted, you will work with the journal publisher to produce the final version of your manuscript (sometimes referred to as the *camera-ready copy*). The time period between initial submission to final publication for most journals is 12-24 months.

6 ARE THERE DIFFERENT KINDS OF JOURNAL ARTICLES?

Yes. Generally, there are three categories: (1) research contribution, (2) case study (experience report), and (3) survey paper. A *research contribution* is the documenting of a specific piece of knowledge that was previously unknown. A *case stu*dy is a formal description of an activity of broad, general interest to the community. While there is no requirement for new knowledge in terms of a research result, a well-written case study should provide clear indications of future research needs within the activity studied. A *survey paper* is a comprehensive review of all research in a given area. In addition to an extensive bibliography, a good survey paper offers a useful organizing framework for discussion of concepts, and provides broad, general summaries of extant research in terms of this framework. Some journals, e.g. *ACM Computing Surveys*, publish survey papers exclusively.

7 ANY SUGGESTIONS FOR WHAT MAKES A GOOD JOURNAL ARTICLE?

Yes. Certainly, not all published articles are created equally. Some are better than others, and it would be good practice for anyone seeking to be an active researcher to read journals in their field on a regular basis. In addition, here are a few broad guidelines to consider when developing an article for submission to a journal:

1. *Clearly establish your contribution.* In the Introduction you should clearly indicate whether your

article is a research contribution, case study or survey paper. If it is a research contribution, you should clearly state the nature of the contribution. If the article is a case study, you should clearly explain what you want readers to come away with after reading your article.

2. *Establish the prior art.* If you are the only researcher working in an area, perhaps everyone else knows something you do not! To be publishable, your article *must* give a good accounting of related work, *especially* the work that your results build on. If the purpose of your article is to be a research contribution or case study and the body of prior art is large, there is no need to include a survey paper within your paper. But your paper should reference such surveys if they exist.
3. *Provide useful examples.* If your paper proposes a new approach to some problem, illustrative examples are extremely useful.
4. *Avoid gratuitous assertions and overly broad generalizations.* Statements within an archival journal should be unambiguous and defensible. Unless you can provide formal argument refining your assertion, statements like "current simulations are too hard to use" should be strictly avoided.
5. *Design for readability*. Spend some time thinking about the flow of the article. Does it establish the premise in the introduction and then logically flow through intermediate sections to the conclusions? Does the paper read well? Does the language conform to technical writing conventions (e.g. third person, active voice)?

8 ANYTHING ELSE I SHOULD KNOW?

Probably. But who's to say for sure?

One of the best ways to become a good producer of technical literature is to first become a good consumer of technical literature. Read. Read. Read.

Also consider volunteering as a referee for the conferences and journals that you publish in. This is a valuable service to the scientific community and will also help you in your research in a variety of ways: (1) it exposes you to results prior to their formal publication, (2) handling papers slightly outside your main area of research forces you to become familiar with the prior art in that area, (3) forming ideas about what is good and bad in other people's writing will help you become more cognizant about these factors in your own writing.

Best of luck with your research and happy publishing!

ADDITIONAL SOURCES OF INTEREST

ACM *Transactions on Modeling and Computer Simulation* Homepage. URL: http://www.acm.org/tomacs

Alley, M. The Craft of Scientific Writing. Springer-Verlag. 1996. (3rd Ed.)

Georges, T.M. Online Course in Analytical Writing for Science and Technology. 1996. URL: http://home.attbi.com/~tgeorges/write/

Georges, T.M. *Business and Technical Writing Cookbook: How to Write Coherently on the Job*. Syntax Publishing, January 1983.

SCS *Simulation* Homepage. URL: http://www.scs.org/pubs/simulation

Society for Technical Communication Homepage. URL: http://www.stc.org/

AUTHOR BIOGRAPHY

ERNEST H. PAGE is President of Abstraction and Associates, LLC and the Technical Advisor to the U.S. Army Model and Simulation Office (AMSO). Prior to forming Abstraction and Associates, he was a member of the technical staff of The MITRE Corporation (1995-2001) where he was involved in several projects in the area of Advanced Distributed Simulation (ADS). He served as the integration and test lead for the Aggregate Level Simulation Protocol (ALSP) project (1995-1998), participated in the formulation of the High Level Architecture (HLA) and contributed to the development of the HLA Runtime Infrastructure (RTI) Verification Facility (1998-2000). He also served as an architect for the One Semi-Automated Forces (OneSAF) program (1999). In addition, he led a number of research projects in the area of web-based and composable simulation. Dr. Page received the B.S., M.S. and Ph.D. degrees in Computer Science from Virginia Tech in 1988, 1990 and 1994 respectively. The author of over 40 articles in modeling and simulation, he is an Associate Editor for the Association for Computing Machinery (ACM) *Transactions on Modeling and Computer Simulation*, the Institute for Electrical and Electronics Engineers (IEEE) *Transactions on Systems, Man and Cybernetics* and the Area Editor for Military Applications for the Society for Computer Simulation (SCS) *Simulation*. He served as Chairman of the ACM Special Interest Group on Simulation (SIGSIM) from 1999-2001, and is currently the SIGSIM representative to the Winter Simulation Conference (WSC) Board of Directors. He is a Director-at-Large of SCS, and a member of ACM, IEEE/CS, SCS, the Military Operations Research Society (MORS) and Upsilon Pi Epsilon.