

## *Full Length Research Paper*

# Publication process for engineers

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**Journal publication is an important indicator of research productivity for individual researchers as well as academic institutions. However, for young faculty members the publication process can appear equivocal and daunting. If the academic does not actively engage themselves early in this process, then her or his career becomes an uphill (and sometimes insurmountable) battle. To assist the young academic, this study, sponsored by the National Science Foundation ADVANCE program, surveys journal editors representing numerous engineering fields. The survey attempts to quantify publication timelines and acceptance rates, and ascertain journal policies, advice for successful publishing, and gender differences.**

**Key words:** Engineering education, publications, survey.

## INTRODUCTION

Publishing provides a repository of important research efforts and a recognition mechanism for researchers and institutions. However, despite its importance to academic success, the publication process may appear intimidating to doctoral students and novice faculty members. In an effort to aid the new academic, this paper summarizes a publication process survey sent to engineering journal editors that addresses a range of topics to include publication guidelines, acceptance rates, timelines, gender differences, rejection factors, and open-ended counsel.

The efforts in this paper are a subset of works prepared for National Science Foundation grant SBE 0123493. The objective of the NSF grant was to quantify and explain the publication process for new academics. The culmination of the grant effort is an educational CD ROM summarizing all aspects of the scholarly publication process. This paper summarizes only one aspect of the NSF grant efforts – specifically, a survey sent to engineering journal editors around the world, requesting their inputs and opinions regarding a range of journal publication guidelines and metrics.

In general, the purpose of the NSF grant was to prepare an educational CD ROM that aggregates advice and best practices from accomplished engineering academics that will assist both doctoral students and junior faculty members achieve success in journal publication. The topics addressed on the CD ROM include an overview of journals and their editorial structures, types of journal papers, elements of successful paper planning and authoring, the peer review process, impact factors and citations, ethical

considerations of writing, and how to be a good reviewer. Additionally, included is a summary of a publication process survey sent to engineering journal editors that addresses a range of topics including publication guidelines, acceptance rates, timelines, perceived gender differences, rejection factors, and open-ended counsel.

There are videos of interviews with a variety of academics, from just starting out to very senior, on the journal publication process. Tutorial videos on searching for citations and analyzing journal impact factors are present. A carefully chosen set of published papers addressing certain topics regarding publishing in journals is included (with the kind permission of the authors). Examples of reviews and responses are included. Comments on emerging issues and formats of archival scholarly publication are given and the issue of plagiarism is addressed.

To the authors' knowledge these efforts are a first attempt to provide publication advice to the engineering academic audience. This is not to say that the scientific literature is void of publication advice. In fact, several excellent texts summarizing the publication process from a general readership perspective include McCloskey (McCloskey, 1987; Cantor, 1993; Silverman, 1999; Luey, 2002). Additionally, articles directed towards economics, finance, management, and accounting researchers may also be found in (Zivney and Bertin, 1992; Mitenko and Diamond, 1994; Henderson and Reichenstein, 1998; Chow and Harrison, 1998; Koh, 2003). Papers addressing gender differences in the publication process for accounting researchers include (Dwyer, 1994; Streuly and

**Table 1.** Journal editor participants by engineering discipline.

Journal Discipline	Number in Survey
Chemical	6
Industrial	6
Civil and Environmental	5
Engineering Management	5
Electrical	4
Mechanical	4
Systems	3

and Maranto, 1994; Collins et al., 1998).

## Survey

The survey's objective was to acquire descriptive statistics of the engineering publishing process. The objective of the survey was to obtain descriptive statistics to provide a guide to new academics regarding the publishing process. Please bear in mind this survey was completed as a subset task for an educational CD ROM with informal interviews with editors and plain-speak dialogue with editors. The survey was not structured per say to reach statistical conclusions, but only to gather guidance and "rules of thumb" to consider when beginning the publication process.

Although the acquired survey results are applicable to all academics, the National Science Foundation ADVANCE program funded these efforts to improve the recruitment and retention of women in engineering academia and to enhance career development of women engineering academics by addressing publications in refereed scholarly journals. Many novice scholars do not fully understand archival journals and the publishing process; they do not appreciate the differences among journals, they underestimate the review process lead time, they do not know how to constructively react to critical reviews or rejections, they are reluctant to argue or rebut, and they do not know how to join the editorial ranks of journals. The end result is often an abbreviated list of journal papers that does not truly reflect their research or their research potential. For many institutions of higher learning, a deficit of journal publications inevitably leads to denial of tenure or delayed promotion.

In order to request specific inputs and guidelines from journal editors, a 19-question web survey was e-mailed to 121 journal editors representing numerous engineering fields. The 121 engineering journal editors solicited were obtained from the ISI journal citation reports service spanning aerospace, chemical, civil, environmental, Industrial, and mechanical engineering disciplines. The ISI Journal Citation Reports® is one of the most respected journal repositories in the sciences disciplines and offers a systematic, objective means to critically evaluate the world's leading journals, with quantifiable, statistical information based on citation data. By compiling articles' cited

references, the ISI reports measure research influence and impact at the journal and category levels, and shows the relationship between citing and cited journals.

Of the 121 editors contacted across all engineering disciplines, 40 usable responses (or a response rate of 33%) were aggregated for this study. The 40 respondents represent editorial experience from 33 engineering journals in 7 disciplines. Table 1 contains the number of journals represented per engineering field. The survey addresses a variety of publication topics. In general, it attempts to quantify the publication timeline and acceptance rates, and ascertain journal policies, advice for successful publishing, and gender differences. Appendix 1 contains a journal participant list. Appendix 2 contains the questions used for this survey.

## Survey results

Table 2 summarizes the publication policies and guidelines of the survey participants. Of the 33 journals represented, only one of them requires a submission fee to initiate the review process. The majority of the journals send papers to three reviewers, with one journal using one reviewer and another using four reviewers. The preferred transparency is a single-blind process, which implies the authors do not know their reviewers. Eighteen percent of the journals surveyed utilized a double-blind process wherein the authors' names are shielded from the reviewers and vice versa. The median page count of an accepted paper is 19 pages.

Table 3 highlights the types of papers accepted in engineering journals. Note that analytical, theoretical, and conceptual developments comprise nearly 60% of all papers accepted in engineering journals. Case studies, literature reviews, and educational papers comprise nearly one-third of engineering articles. And finally, responses, book reviews, and position papers comprise a minority less than 15% of papers.

Table 4 summarizes the acceptance rates of the surveyed participants' journals. The average acceptance rate across all engineering journals is 35%, with only a small percentage of papers accepted without a major revision. Also, note that the editor agrees with the reviewers' decision about 75% of the time.

Table 5 summarizes publication processing time information. The editor initially reviews the paper about 3 months before submitting it to reviewers, the initial peer review time is 4 months on average, and the editor requires 1 month before making a final decision regarding paper acceptance. The total review time (including all revisions) ranges from 6 to 18 months, and a delay of 6 to 12 months is expected from paper acceptance to in-print.

Editors selected the top five factors contributing to a rejected journal paper, in order of observed frequency. Table 6 summarizes the responses. The 'number of times selected' indicates the total number of times a rejection

**Table 2.** Journal policies and guidelines.

Submission fee		Usual number of reviewers		Review transparency		Final page count	
91%	Free	3%	One	56%	Single blind	10%	< 10
3%	\$50 - \$150	18%	Two	18%	Double blind	18%	10 - 15
6%	NA	78%	Three	23%	Neither	15%	15 - 20
		3%	Four	3%	NA	26%	20 - 25
						15%	> 25
						15%	NA
						Median	19

\*NA (not available).

**Table 3.** Types of papers in engineering journals.

Rank		Percentage of papers
1	Analytical developments	20%
2	Theoretical developments	18%
3	Conceptual developments	17%
4	Case studies	11%
5	Literature reviews	10%
6	Educational (or how-to) papers	10%
7	Responses to already published research	7%
8	Book reviews	4%
9	Position papers	3%

**Table 4.** Journal acceptance rates.

Overall acceptance rate		Acceptance rate without major revision		Editor concurrence	
Response	Accep. rate	Response	Accep. rate	Response	Editor rate
3%	< 10%	38%	< 5%	5%	< 60%
15%	10 - 20%	20%	5 - 10%	23%	60 - 70%
28%	20 - 30%	13%	10 - 15%	26%	70 - 80%
15%	30 - 40%	8%	15 - 20%	23%	80 - 90%
28%	> 40%	5%	> 20%	10%	90 - 100%
13%	NA	18%	NA	13%	NA
Median	32%	Median	8%	Median	76%

factor was identified in the top 5 reasons for rejection. The average importance rating is an indicator of the significance the respondent placed on the rejection factor. The rating is based on a 5-point scale with the most likely reason receiving a five. Thus, a rating of a 5 indicates the respondent selected the rejection factor as the most likely reason for rejection. The overall importance rating multiplies the 'number of times selected' and the 'average importance rating' to provide an aggregate perspective. Finally, the overall importance rating is used to proxy the percent of papers rejected per rejection factor by proportioning the overall importance rating. For example, the rejection factor 'lack of contribution to the field' was selected in the top 5 reasons for publication rejection by all 40

survey respondents. It received a rating of 4.77 on a 5-point scale, an overall importance rating of 191, and is the factor accounting for one-third of all rejected papers.

In order to identify perceived gender aspects of the publication process, the survey participants were asked the following questions:

"Have you observed any barriers in the publication process that impact the acceptance of women researchers' papers? If so, would you elaborate?"

Of the survey respondents, none have witnessed gender barriers in the publication process. Several comments are worth noting. Five respondents stated that barriers are

**Table 5.** Publication timeline (in months).

Initial editor review		Initial peer review		Editor decision		Total review time (including revisions)		Accepted papers to print	
23%	< 1	17%	< 2	74%	< 1				
43%	1 - 3	43%	2 - 4	11%	1 - 3	14%	< 6	34%	< 6
29%	3 - 5	26%	4 - 6	3%	3 - 5	43%	6 - 12	49%	6 - 12
3%	5 - 7	6%	6 - 8	9%	5 - 7	34%	12 - 18	9%	12 - 18
3%	NA	3%	> 8	3%	NA	3%	18 - 24	3%	18 - 24
		6%	NA			6%	NA	6%	NA
Median	2.55	Median	3.89	Median	1.68	Median	11.23	Median	9.12

**Table 6.** Reasons for paper rejection.

Rank	Rejection factor	Number Of times selected	Average importance rating	Overall importance rating	Percent of papers rejected
1	Lack of contribution to the field	40	4.77	191	32%
2	Poorly framed research problem	35	3.07	108	18%
3	Lack of theoretical/empirical development	29	3.23	94	16%
4	Poor paper organization and presentation	29	2.56	74	12%
5	Inadequate Conclusion	23	2.17	50	8%
6	Inadequate literature Review	18	1.94	35	6%
7	Other reason	11	2.46	27	5%
8	Unclear introductory section	7	1.75	12	2%
9	Excessive length	8	1.00	8	1%

high for everyone to include gender, nationality, and ethnic background, two respondents stated that women have higher acceptance rates versus men in the journals that they manage, and one respondent stated that even though women face real or imaginary barriers in the work environment, these barriers do not exist in the publication process.

“What, if any, additional or unique advice would you give to women researchers (versus men) concerning a successful publication practice?”

The majority of respondents stated that advice for women researchers would be the same for men researchers. One respondent sums it best “We are just looking for great papers”. However, several respondents had additional comments. Four respondents advise women researchers to be aggressive and persistent and not to take criticism personally, one respondent states that women tend to write more tentatively and less arrogantly than men, one respondent recommends that women should exploit their better skills in organization and methodical work (versus men), one respondent recommends women researchers to use initials on submitted papers instead of complete names, and one respondent recommends that journals should adopt a double-blind review process.

## Conclusions

This study surveyed journal editors from a variety of engineering disciplines in order to quantify the publication process and capture expert advice concerning a successful publication career for beginning academics. Topics discussed included publication guidelines, acceptance rates, timelines, and gender differences. These results quantify the publication timeline and encourage active and quality research early in the academic career. The information should be used to help new academics develop

effective publishing strategies.

More specifically, a 19-question web survey was e-mailed to 121 journal editors representing aerospace, chemical, civil, environmental, industrial, and mechanical engineering disciplines. Of the 121 editors contacted, 40 usable responses from 33 engineering journals in 7 disciplines were used for this study. Of the 33 journals represented, only one of them requires a submission fee to initiate the review process. The majority of the journals send papers to three reviewers, and the preferred transparency is a single-blind review process. The average

page count of an accepted paper is 19 pages. Nearly 60% of all accepted papers are classified as analytical, theoretical and conceptual developments. The average acceptance rate across all engineering journals is 35%. The total review time (including all revisions) ranges from 6 to 18 months, with a median of 11 months. Finally, nearly two-thirds of papers are rejected because of a lack of contribution to the field, a poorly framed research problem, and/or lack of theoretical/empirical developments.

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## APPENDIX 1 – JOURNAL PARTICIPANTS

### Chemical

AICHe Journal  
 Industrial and Engineering Chemistry Research  
 Journal of Membrane Science  
 Physics and Chemistry of Liquids  
 Physics of Fluids  
 Reviews in Chemical Engineering

### Industrial

Engineering Economist  
 Human Factors  
 IIE Transactions  
 Journal of Manufacturing Systems  
 Naval Research Logistics  
 Transportation Science

### Civil and environmental

Journal of Environmental Engineering  
 Journal of Environmental Quality  
 Journal of Materials in Civil Engineering  
 Journal of Soil and Water Conservation  
 Journal of Water Resources Planning and Management

### Engineering management

IEEE Transactions on Engineering Management  
 Journal of Engineering Education  
 Journal of Operations Management  
 Management Science  
 Manufacturing and Service Operations Management

### Electrical

IBM Journal of Research and Development  
 IEEE Transactions on Industrial Electronics  
 IEEE Transactions on Semiconductor Manufacturing  
 Journal of Computers and Structures

### Mechanical

IEEE Transactions on Advanced Packaging  
 IEEE Transactions on Computer Aided Design  
 Journal of Applied Mechanics  
 Journal of Structural Engineering

### Systems

IEEE Transactions on Evolutionary Computation  
 IEEE Transactions on Neural Networks  
 IEEE Transactions on Reliability

## APPENDIX 2 – SURVEY QUESTIONS

### Publication process questions

On average, what percent of papers are eventually accepted at your journal?

- Less than 10%
- 10 - 20%
- 20 - 30%
- 30 - 40%
- Greater than 40%

What percent of papers get accepted without requiring a major revision?

- Less than 5%
- 5 - 10%
- 10 - 15%
- 15 - 20%
- greater than 20%

What is the standard number of reviewers to assign to one paper?

- a. one
- b. two
- c. Three
- d. Four
- e. Five

What percent of the time do you agree with the reviewer's decision recommendation?

- a. Less than 60%
- b. 60 - 70%
- c. 70 - 80%
- d. 80 - 90%
- e. 90 - 100%

What is the average length (in pages) of an accepted journal paper?

- a. Less than 10 pages
- b. 10 - 15 pages
- c. 15 - 20 pages
- d. 20 - 25 pages
- e. greater than 25 pages

Is your review process single blind, double blind, or neither?

- a. Single blind
- b. Double blind
- c. Neither

What submission fee does your journal charge?

- a. Submission is free
- b. Less than \$50
- c. \$51 - \$150
- d. \$151 - \$250
- e. Greater than \$250

### Publication Content Questions

Select five of the following factors that contribute to a rejected journal paper. Please rank in order of frequency and/or importance (1-5).

- \_\_\_\_\_ Lack of contribution to the field
- \_\_\_\_\_ Lack of theoretical/empirical development
- \_\_\_\_\_ Poorly framed research problem

- \_\_\_\_\_ Poor paper organization and presentation
- \_\_\_\_\_ Unclear introductory section
- \_\_\_\_\_ Inadequate literature review
- \_\_\_\_\_ Inadequate conclusions from the proposed research

- \_\_\_\_\_ Excessive length
- \_\_\_\_\_ Other reason

Please rank in order of frequency (up to 9, if applicable) of the types of papers that are accepted at your journal.

- \_\_\_\_\_ Theoretical developments
- \_\_\_\_\_ Conceptual developments
- \_\_\_\_\_ Analytical developments
- \_\_\_\_\_ Literature reviews
- \_\_\_\_\_ Position papers
- \_\_\_\_\_ Responses to already published research
- \_\_\_\_\_ Case studies
- \_\_\_\_\_ Book reviews
- \_\_\_\_\_ Educational (or how-to) papers

### Questions on Publication Timeline

What is the average time length for the entire review process from 1<sup>st</sup> submission to acceptance – including subsequent revisions (in months)?

- a. Less than 6 months
- b. 6 - 12 months
- c. 12 - 18 months
- d. 18 - 24 months
- e. Greater than 24 months

What is the average time length from accepted papers to print (in months)?

- a. Less than 6 months
- b. 6 - 12 months
- c. 12 - 18 months
- d. 18 - 24 months
- e. Greater than 24 months

What is the average time length for the initial editor review process (in months)?

- a. Less than 1 month
- b. 1 - 3 months
- c. 3 - 5 months
- d. 5 - 7 months
- e. Greater than 7 months

What is the average time length for the peer review process (in months)?

- a. Less than 2 months
- b. 2 - 4 months
- c. 4 - 6 months
- d. 6 - 8 months
- e. Greater than 8 months

What is the average time length for the decision to either accept, revise, or reject, after receipt of the reviewer's recommendation (in months)?

- a. Less than 1 month
- b. 1 - 3 months
- c. 3 - 5 months
- d. 5 - 7 months
- e. Greater than 7 months

### Open-Ended Questions

Are you willing to conduct a follow-up interview with the National Science Foundation investigators? If yes, please

provide your name, school, and email address.

In two or less sentences, what is your description of an ideal journal paper?

What advice would you provide young researchers as they prepare to begin the journal publication process?

Have you observed any barriers in the publication process that impact the acceptance of women researchers' papers? If so, would you elaborate?

What, if any, additional or unique advice would you give to women researchers concerning a successful publication practice (versus advice given to male researchers)?