How to Write an Effective Technical Paper

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IEEE PES CCC Webinar
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Webinar Speaker,
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Education
M.S., Electrical Sciences, State University of New York at Stony Brook, 1975.
B.Sc., Electrical Engineering, Bangladesh University of Engineering and Technology, Dhaka, 1972

Professional Society Activities
- IEEE Member since 1975, Fellow 1998, Life Fellow 2014
- President, IEEE PES, 2018-2019
- Vice President, Publications, IEEE, 2006
- Editor-in-Chief, IEEE Transactions on Sustainable Energy, 2010-2012
- Launched, the IEEE Power & Energy Technology Systems Journal (Open Access), 2014
IEEE Related Media

IEEE PES Authoring Webinar

Professor Saifur Rahman
Virginia Tech – Advanced Research Institute, USA

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Who writes scientific papers?

- Engineers, scientists, educators and researchers from:
  - Corporations
  - Academia
  - Government
- Students typically write and present conference papers before submitting journal articles
Audience

What IEEE editors and reviewers are looking for

- Content that is appropriate, in scope and level
- Clearly written original material that addresses a new and important problem
- Extension of previously published work
- Valid methods and rationale
- Illustrations, tables and graphs that support the text
- References that are current and relevant to the subject
Audience

How does the review process work?

- Editor-in-Chief gets the paper after it goes through content match check (iAuthenticate) and “banned author” check
- If the paper is in scope for the journal, it is assigned to an editor (associate editor)
- Editor assigns the paper to five or more reviewers
- Reviewers send their comments back to the editor
- Editor makes a recommendation to the EIC as follows:
  - Accept
  - Revise & Resubmit
  - Reject
- The EIC makes the final decision and informs the corresponding author
Audience

Why IEEE editors and reviewers reject papers

• The content is not a good fit for the publication
• There are serious scientific flaws:
  • Inconclusive results or incorrect interpretation
  • Fraudulent research
• It is poorly written
• It does not address a big enough problem or advance the scientific field
• Most of the work was previously published
• The quality is not good enough for the journal
• Reviewers have misunderstood the article
Structure
Paper Structure

Elements of a manuscript

Title
Abstract
Keywords
Introduction
Methodology
Results/Discussions/Findings
Conclusion
References
An effective title should...

- Answer the reader’s question: “Is this article relevant to me?”
- Grab the reader’s attention
- Describe the content of a paper using the fewest possible words
  - Is crisp, concise
  - Uses keywords
  - Avoids jargon
Paper Structure

Abstract

A “stand alone” condensed version of the article
  • No more than 250 words; can use past or present tense
  • Uses keywords and index terms
Use in the Title and Abstract for enhanced Search Engine Optimization
A description of the problem you researched
It should move step by step through:

- Generally known information about the topic
- Prior studies’ historical context to your research
- Your hypothesis and an overview of the results
- How the article is organized

• The introduction should be:
  • Specific, not too broad or vague
  • About 1-2 pages
  • Written in the present tense
Problem formulation and the processes used to solve the problem, prove or disprove the hypothesis

Use illustrations to clarify ideas and support conclusions:

- **Tables**
  Present representative data or when exact values are important to show

- **Figures**
  Quickly show ideas/conclusions that would require detailed explanations

- **Graphs**
  Show relationships between data points or trends in data
Paper Structure

Results/discussion

Demonstrate that you solved the problem or made significant advances

Results: Summarizes the Data
Should be clear and concise
Use figures or tables with narrative to illustrate findings

Discussion: Interprets the Results
Why your research offers a new solution
How can it benefit other researchers professionals
**Paper Structure**

**Conclusion**

- Explain what the research has achieved
  - As it relates to the problem stated in the Introduction
  - Revisit the key points in each section
  - Include a summary of the main findings and implications for the field
- Provide benefits and shortcomings of:
  - The solution presented
  - Your research and methodology
- Suggest future areas for research
Support and validate the hypothesis your research proves, disproves or resolves.

There is no limit to the number of references.

But use only those that directly support your work (about 30).

Ensure proper author attribution:

Author name, article title, publication name, publisher, year published, volume and page number, Digital Object Identifier (DOI).
Ethics
Plagiarism

- Avoid plagiarism
  - Cite and separate any verbatim copied material – **but how much?**
  - Paraphrase other’s text properly, and include citation
  - Credit any ideas from other sources
  - Familiarize yourself with IEEE Policies

Refer to our Tips Sheet
Where to Publish?
Traditional Journals -
Articles available through subscription

Open Access Journals –
Author pays, free download

Hybrid Journals –
Most articles are traditional, some are open access (author preference)
Open Access Publications
Next Steps

Open Access Opportunity for IEEE Authors (Author pays model)

IEEE provides 3 open access publishing options to meet the varying needs of authors:

- New multidisciplinary journal, IEEE Access
- 100+ Hybrid journals
- Fully open access topical journals

http://open.ieee.org/
PES Full Open Access Option #1

IEEE Open Access Journal of Power and Energy

– Will start publishing articles from January 2020
– Existing OA Journal of Power and Energy Technology Systems will be rebranded with this new name, scope covering the entire field of PES for both practice-oriented and academic articles
– Article processing charge subsidised at US$1350
– Between 10-15 articles each year will receive further subsidy depending on authors’ affordability/circumstances
PES Full Open Access Option #2

A dedicated section on Power & Energy for publishing papers in the PES field in IEEE Access

- The section will start from January 2020, submissions started in September 2019
- Paper will be handled by 3 PES-appointed Editors
- APC: US$1750
Impact Factor
Impact Factor from Journal Citation Reports

Journal Citation Reports
The recognized authority for evaluating journals

Description:
Journal Citation Reports® 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, JCR helps to measure research influence and impact at the journal and category levels, and shows the relationship between citing and cited journals. Available in Science and Social Sciences editions.

To find out more, visit us on the Web of Science™ website
Impact Factor is not necessarily enough of a metric

Other attributes:

• Journal’s reputation in the community is important
• For new and lesser known journals – look at the editorial board, their reputation
Process of Writing the Paper

Discuss the content among team members
Literature search – Reference List
Description of the Experiment/Model
Results/Discussion
Write the Conclusion
Collect the components – Prepare the draft
All members comment on the draft
Produce the final copy
Prof. Saifur Rahman ([s.rahman@ieee.org](mailto:s.rahman@ieee.org))

[https://www.srahman.org](https://www.srahman.org)

Past-President of IEEE Power & Energy Society
Past-Chair, IEEE Publication Services & Products Board

PES accomplishments:
- PES University
- PES Corporate Engagement Program
- PES Chapters’ Councils in China, India, Africa and Latin America