# How to Write an Effective Technical Paper

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> IEEE PES CCC Webinar 29 August 2020





### Webinar Speaker,

Saifur Rahman, Ph.D. Professor and Director Virginia Tech Advanced Research Institute



#### Education

Ph.D., Electrical Engineering, Virginia Polytechnic Institute and State University, 1978. 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 PES, 2001-2003, 2012-2013
>Vice President, Publications, IEEE, 2006
>Editor-in-Chief, IEEE Transactions on Sustainable Energy, 2010-2012
>Editor-in-Chief, IEEE Electrifications Magazine, 2013-2014
>Launched, the IEEE Power & Energy Technology Systems Journal (Open Access), 2014











### Audience Scientific research publishing

- 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
  - o 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



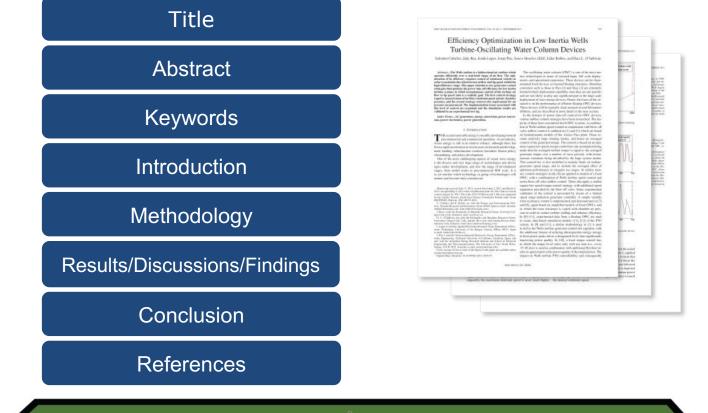


# Structure





### Paper Structure Elements of a manuscript







### Paper Structure Title

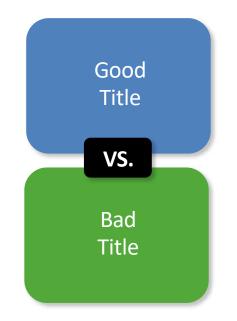
An effective title should...

•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

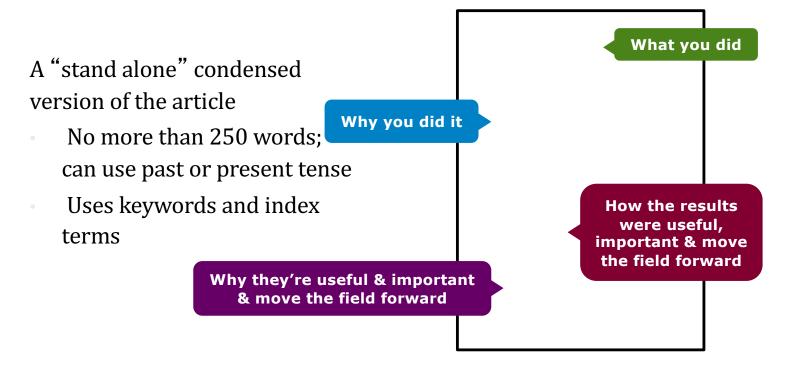
- Is crisp, concise
- Uses keywords
- Avoids jargon





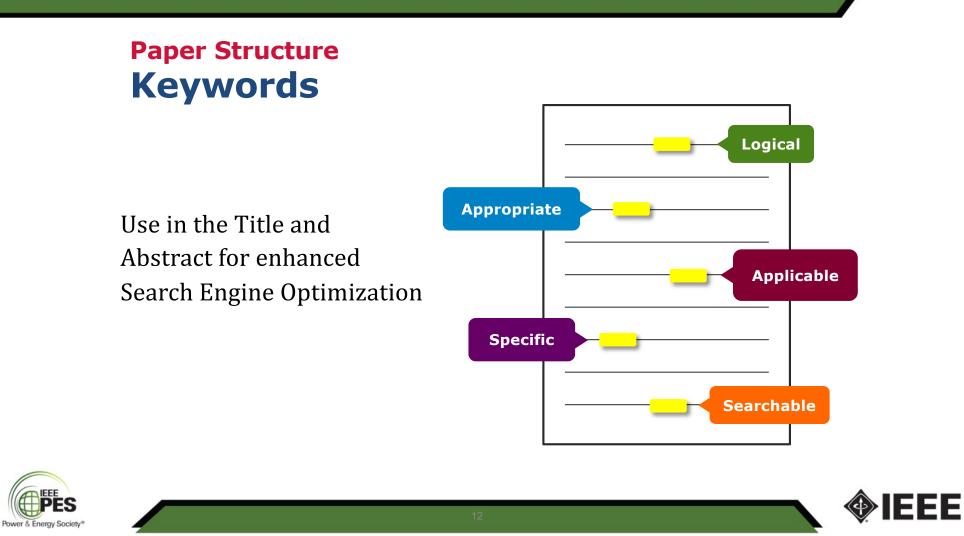


### Paper Structure Abstract









### Paper Structure Introduction

- A description of the problem you researched
- It should move step by step through:



- The introduction should be:
  - Specific, not too broad or vague
  - About 1-2 pages
  - Written in the present tense

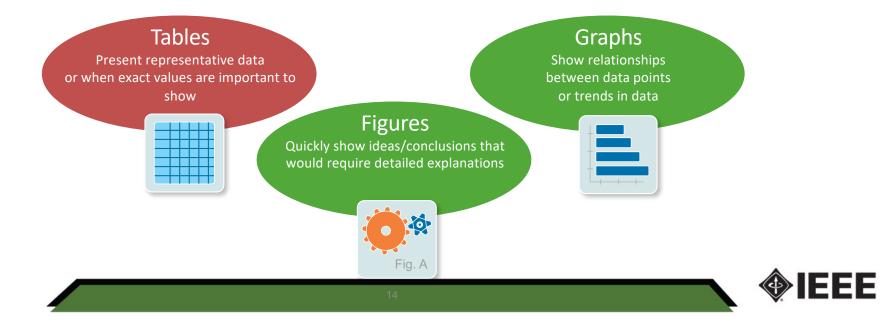




### Paper Structure Methodology

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- Problem formulation and the processes used to solve the problem, prove or disprove the hypothesis
- Use illustrations to clarify ideas and support conclusions:



### **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



INVENEZ-MUNOT # 4 - LET RETRIEVAL METUODO FROM LANDAUTA TREPARAL INDUADED SENSOR DATA

the SC algorithm over the whole range of  $\omega$  values increase to 3-4 K, except for the TICR(ref) dottboux, with an RMSE of 3 K. This last result is explained by the  $\omega$  distribution, which is biased toward low values of  $\omega$  in this dottboux. When only strangehence profiles with to values hower than 3 g-cm<sup>-2</sup> are selected, the SC algorithm provides RMS around 1.5 K, with almost equal values of this and strandard deviation, around 1 K in both cases (with a negative bios, thus So understimates the LST). In contrast, when only use set higher than 3 g  $_{\rm corr}^{-2}$  are considered, the SC algorithm vides RMSEs higher than 5 K. In these count, it is preferable alculate the atmospheric functions of the SC algorithm disetly from (3) rather than approximating them by a polynomial ch as given by [4]

V. DISCUSSION AND CONCLUSION The two Londsot-3 TIR bands allow the intercomparison of two LST retrieval methods based on different physical assumptions, such as the SC (only one TIR band required)

Discussion

ms (two TIR bands required). Direct inversion transfer equation, which can be considered m, is assumed to be a "grou tion that the informs tion about the and L<sub>2</sub>) is accurate enough. The SC signature on this letter is a continuation of the previous SC veloped for London'4 and London'5 TM sensors, as EIM+ sensor on board the London'7 platform

[0], and it could be used to generate consistent LST products from the historical Landant data using a single algorithm. An advantage of the SC algorithm is that, upart from surface emisily water upper content is required as input. However, acted that errors on LST become unacceptable for high por contents (e.g.,  $> 3 \text{ g} \cdot \text{cm}^{-2}$ ). This problem can be alved by computing the atmospheric functions directly while there contains the set of the standard structure of the set us, a wide range of water vapor values; and that it only requires water vapor as input (apart from surface emissivity at the two TIR bands). However, the SW algorithm can be at the two like tenant, However, the 30 Wignering can be only opplied to the area Landschot TIRS dans, ince provious TMEET sensors only had one TIR bond. The LST algorithms presented in this later wave tested with simulated data sets obtained for a variety of global atmospheric conditions and surface antisivities. The sensible theored SMEET

loss of typically less than 1.5 K, although for the SC alaccuracy is only achieved for w values below m<sup>-2</sup>. Algorithm teeting also showed that the SW errors wer than the SC errors for increasing water vapor, and serva, as demonstrated in the simulation study presented brino and Jiménez-Muñoz [18]. Although an estensive ralidation exercise from in sits measurements is required to valuations essentials from the statistication in sequence to manase the generationance of the two LST algorithms, the sensiti-obtained for the simulated date, the sensitivity analysis, as well as the gravitous findings for algorithm with the sume mothe-motical structure give confidence in the algorithm scenarios stad have

Results

REFERENCES [1] J. R. Jross, J. L. Dyver, and J. A. Rossi, "The

- Oct. 2008.
  [4] W. Karata and M. Acderson, "Advances in thermal influence sectors sectoring for line de actions modeling," Agro. Power Meteorol., vol. 140, no. 12, pp. 2017–2021, Dava 2008.
  [5] X. L. Li, A. M. Rong, K. Wu, H. San, G. Yao, J. Wan, J. S. Taigo, and J. A. Soltana, "Speech Advance load sectors are constrained with 131, pp. 14–57.
- [6] Z.-L. Li, H. Wu, N. Wang, S. Qiu, J. A. Sobrino, Z. Wan, R.-H. Tang and G. Yan, "Land surface emissivity retrieval from axiality data," *Int.*.
- and G. Yan, "Land series or you A. A. Solemen, Z. Wan, E. M. Tan, and G. Yan, "Land series arised within particular barries," *Int. J. Revent Form*, vol. 34, no. 010, pp. 5694–5217, 2012.
  (7) A. M. Milla, "Three decades of indicat instrument," *Photogramm. Big Revent Form*, vol. 64, no. 7, pp. 853–852, M. 1997.
  (8) A. Rand, I. S. Soler, S. D. Palloceri, D. J. Hadde, S. J. Hadde, R. J. Matham, G. Charate, and S. M. O'Dornall, "Landart TM and TTM- formation bard oblivation".
- fitted window measurements was a set of the set of t
- three for astimating see and load surface ( Int. J. Remote Same, vol. 17, no. 11, pp. ) C. Sminez-Mafec and J. A. Schrine, "Solit-window coefficiency"
- Ind softes temperature retired from low-resolution thermal is second, NEEF Genetic Sensets Sens. Lett., vol. 5, no. 4, pp. 60 Oct. 2006. A. Back, G. F. Anderson, F. X. Ashurya, J. H. Chetwynd, L. S. Bet-andre S. S. Anderson, F. X. Ashurya, J. H. Chetwynd, L. S. Bet-retire and the second sec
- E R Sh Homeon AFR, MA, USA: An 24," R
- pactol Bhony vanion 2.0," Researd Stat. Reinten, vol. 1; p. 711–715, Ap. 2009. C. Cristôni, J. C. Jinskaz-Mefez, J. A. Sobrino, M. Ninyi
- Chromer, F. C. Temporements in land surface temperature estimate Landaut series termil band using value value and air temp A Geophys Rev., vol. 114, no. D4, p. D60105 2000.
   D. R. Des, S. M. Uppels, A. S. Simmanda, G. Estimato, S. Roboyachi, U. Andrea, M. A. Estimanda, G. Estimon, J.

D. S. Lewy, S. C. Martin, M. A. Kulmussán, G. Solamon, P. Roser, S. Kobayashi, U. Andrias, M. A. Kulmussán, G. Solamon, P. Roser, R. Radolini, A. C. M. Balajane, L. vun des Jamp, J. Bilder, N. Korneran, C. Sakol, R. Dengand, M. Patesina, A. T. Gene, L. Rinnbergat, S. Z. Bady, R. Hardhood, R. V. Röhn, C. Lukasen, F. Kallsson, M. Kohler, V. Marataund, R. M. McKlyn, R. M. Minney-Faux, J. A. Monzeritas a. Mittiani, A. R. McNally, E. M. Mang, J. S. Mittiani, A. R. McNally, E. M. Mang-6 R.-K. Park, C. Parkey, P. & Kanany, C. Tavisto, F. Vitari, The ERA-Materia reanalysis, Pro-4 the data assignment. 848\_407.5011

- Mattar, C. Durin-Alarofn, J. C. Itméne [17] Giotal, Amorphasis Fooflas from Samelysis Information (GAFER): A new dataset for forward simulations in the flarmoi infined region, NEE Tome. Genet. Review Switz, 2014, submitted for publication. [18] J. A. Storino and J. C. Rushao-Miltor, "Last archive temperature.
- nt in the or of from thermal infrared data: An au retrieval from thermal infrared data: An assessment in the context of the surface processes and ecosystem changes through response analysi (SPECTRA) mission," J. Geophys. Res., vol. 110, no. D36, p. D36103





### 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







### **Paper Structure** References

- 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)

We then have  $(P^{s,+}_t+P^{s,-}_t)^2=(P^{s,+}_t-P^{s,-}_t)^2+4P^{s,+}_tP^s_t$  $<(\hat{P}_{t}^{a,+}-\hat{P}_{t}^{a,-})^{2}+4\hat{P}_{t}^{a,+}\hat{P}_{t}^{a,+}$ (32)  $\hat{P}_{i}^{s,-}$ , we then have  $P_{i}^{s,+} < P_{i}^{s,+}$ ), we obtain that  $c_{a/m}(P_t^{s,+}, P_t^{s,-}) < c_{a/m}(\hat{P}_t^{s,+}, \hat{P}_t^{s,-}).$  (33) the optimal pair  $\{P_t^{k,+}, P_t^{i,-}\}$  must satisfy that = 0, i.e., only one of  $P_t^{k,+}, P_t^{k,-}$  can be non-zero. 1251 4 REFERENCES ables: Energy You can Count on." Tech. Rep. Union of Conned Scie dists. 2013 "Ten steps to a smarter grid," IEEE Ind. Appl. Mag., vol. 16, 62–68, 2010. elo, J. Bia icz, E. Galvan, R. Guisado, M. rats, J. Leon, and N. Moreno-Alfonso, "Power-electronic systems for he grid integration of renewable energy sources: A survey," *IEEE base. Ind. Electron.*, vol. 53, no. 4, pp. 1002–1016, 2006. 1-1250, 2008. z, R. de la Muela, L. Santos, and A. Gonzalez, "Sto s Syst, vol. 23, no. 2, pp Tran T. Signs and A. Khamhadkon **Properly** cited Miller, "Key challenges and recent d hydrogen storage for clean energ 159, no. 1, pp. 73-80, 2006. material 9, no. 2, pp

copressed air energy storage," J. Energy, vol. 2,

no. 2, pp. 106-112, 1978 [14] C. Abbey and G. Joos, "

ergy appli

y and O. Joos, "Supercapacitor lications," IEEE Trans. Ind Appl

one and M Mates "Onti

REF TRANSACTIONS ON SMART GRID, VOL. 5, NO. 4, JULY 2014

- [18] S. Boyd, N. Parikh, E. Chu, B. Peleato, and J. Ecknisin, "Distributed op-timization and statistical learning via the alternating direction method of multipliers," *Foundations Trends Mach Learning*, vol. 3, no. 1, pp. 1–122, 2010.
- 1-122, 2010.
   C. Galderes and M. Campl, "The scenario approach to ro design," *IEEE Trans. Autom. Contr.*, vol. 51, no. 5, pp. 743
   A. Shapiro, D. Dentsheva, and A. Ruzerzynski, *Lectures on Programming: Moduling and Theory.*, Philadelphia, NJ, U
- Y. Zhang, N. Gatsis, and G. Giannakis, "Risk-agement with multiple wind farms," in *Proc* 2013, pp. 1–6.
   Y. Zhang, N. Gatsis, V. Kekatos, and G. Gian
- [22] Y. Zhang, N. Gatsin, V. Kokatos, and O. Giaznakis, "Fluit-aware magnetic of distributed energy resources," in *Proc. Int. Conf. Digitality and Process. Adv.* 2013, pp. 1–5.
  [23] P. Yang and A. Niekowi, "Hybrid energy storage and generation plan used adv. Niekowi," *Physical Report Proc.* 2015, pp. 1–4.
- stati Ani, Multi-Onior Augerte Priorite, Liec. 2015, pp. 1– 1981, "Illectricity Energy Storage Tochology Option: A Whit Yimer on Applications, Costs, and Benefits," Tech. Rep. EF9 Uno, CA, USA, 2010. Internal Solar Rediction Data Base, [Otline]. Available: http: Internal Solar Rediction Data Base, [Otline]. Available: http:// antonal.Solar Rediction Data Base, [Otline].
- [25] National Solar Radiation Data Rase, [Oolins]. Available: http://med. ned.gov/eale/id/data/solar/Radiation/Database 1991 2010 Upda: Uper3 Barnes, 2012.
  [27] EPRI, "Renewable Energy Technical Assessment Guide TA RE:2006, "Tech. Rep. EPRI, Jino Alm, CA, USA, 2007.
  [28] JERCOT Housely Lond Data Archive [Colins]. Available: http://www.
  - ercot.com/gridinfo/load/load\_hist/ M. Orant and S. Boyd, CFX: Matlab Soft Programming, Version 2.0 Beta 2012 [On
- conference "MISO, JEBC [Online]. Available: http://www.fare.gov/markate-we sight/tak-sitectio/mid/water/miso-archives.ap "CAISO Daily Report," 2011, Electric Power Markate: Californi (CAISO, FEEC [Online]. Available: http://www.fare.gov/markate

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and Chair of th

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### Ethics Ethical publishing

### 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



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Power & Energy Society\*

access (author preference)



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### PES Full Open Access Option #1

### IEEE Open Access Journal of Power and Energy

- Will start publishing articles from January 2020
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- Article processing charge subsidised at US\$1350
- Between 10-15 articles each year will receive further subsidy depending on authors' affordability/circumstances





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- The section will start from January 2020, submissions started in September 2019
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– APC: US\$1750



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### **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





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> 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





