**Blockchain implementation to deter voter fraud.**

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**Additional Keywords and Phrases:** Insert comma delimited author-supplied keyword list, Keyword number 2, Keyword number 3, Keyword number 4

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**Abstract:**

Voting irregularities remain a very critical issue which needs to be addressed to preserve a democracy of a nation. In this age of technology, conventional methods for ensuring free and fair elections often lack in providing transparent, tamper free, and decentralized solutions, leaving room for corruption and mistrust among the public. This research writing introduces a novel notion of blockchain technology to address the issues of voter irregularities. Relying on the fundamental aspects of blockchain, such as decentralization, immutability, and transparency, we propose a robust and secure framework for organizing elections. Our approach encompasses the production of a distributed and tamper-proof ledger to record and approve every single vote, ensuring the integrity of the election. The major contributions of this paper incorporate the design and implementation of a blockchain-based voting system that minimizes the risks related with traditional voting approaches. We introduce a decentralized mechanism that amplifies the security and fairness of the electoral process. Furthermore, our solution includes cryptographic techniques to guarantee the privacy of the voters while maintaining the authenticity of election results. Through a holistic evaluation, we exhibit the effectiveness of our blockchain technology in preventing voter fraud, thereby reinforcing the public faith in democracy.

1. Introduction

Rigged elections remain a significant concern for the integrity of democratic elections, leaving doubts on the legitimacy of the final election results, thereby diminishing the electorates faith in democratic processes [2]. incidents of manipulation, forced voting, and filling the boxes with fake ballot papers continue to undermine the foundational ideas of representative governance, warranting a robust and novel measure to secure the electoral system.addressing the concerns of electoral fraud isn’t anything insignificant in this age of democracy and rule of law [14]. preserving the credibility of democratic institutions is imperative in this era of rising dictatorships [8]. With the advent of new technologies accompanies the evolution of nefarious activities, the need for free and fair elections has never been more pressing[5]. The potential consequences on the democratic nature of a society makes the idea of exploring advanced technologies to avoid rigged elections both interesting and important. The inherent multifaceted nature of the elections makes it a very challenging issue to resolve in the first place. naive approaches often fail in providing holistic solutions because they underestimate the complexities pertaining to the security of the entire electoral process. old methods relying on centralized databases or paper-based systems lack the resistance required to deter sophisticated attacks, making the elections more susceptible to manipulation and hocorruption.past attempts to address voter fraud had shortcomings of technological advancements that can provide balanced security, transparency, and voter privacy [9]. centralized systems are vulnerable to hackers, while decentralized solutions may falter to scale in national level. once such example can be the 2016 us presidential elections where there had been allegations of foreign interference to alter the results of the elections to favor a specific candidate for political goals [10]. my proposed blockchain-based approach is unique in a way by leveraging the decentralized, alteration-proof nature of blockchain technology to ensure the integrity of each vote while ensuring voter anonymity. the basic features of blockchain, coupled with cryptographic techniques, differentiates our approach from previous attempts, hence providing a comprehensive and pragmatic response to the long-term problem of fraudulent elections [11].

**Literature Review**

With the passage of time, there has been an increasing amount of scholarly study on election security and voter fraud prevention. these studies have applied a variety of techniques to address the complex issues corresponding to preserving the integrity of democratic processes. initial research primarily highlighted flaws in the conventional paper-based voting methods, emphasizing problems such as ballot manipulation, impersonation, and improper handling. physical security measures dominated the solutions put out in this age, but they were frequently proved insufficient to counter the threats posed by rapidly advancing technologies [1]. With the advent of electronic voting methods, new opportunities and challenges came across. investigating secure communication techniques and cryptographic protocols enabled the researchers to guarantee the privacy and legitimacy of electronic ballots. these initiatives, meantime, were criticized for being too centralized, which opened the door to manipulation and possible single points of failure [11]. voter fraud is a recurring problem that blockchain technology has shown promise in solving in contemporary times. Numerous investigations have assessed the potential of blockchain technology in political processes, highlighting its decentralized and impermeable manipulation attributes. one of the most significant contributions is the automation and security of the voting process using smart contracts [1], which promotes transparency and mitigates the need for faith in centralized authorities. Yet the literature also documents the current discussions and difficulties around the use of blockchain technology in voting. many discussions have focused on issues related to accessibility, scalability, and the trade-off between voter privacy and transparency [3]. to ensure that blockchain-based voting systems are both practical and inclusive, researchers have struggled to strike the proper balance. Additionally, there has been growing interest in the relationship between blockchain technology and other cutting-edge innovations like homomorphic encryption and zero-knowledge proofs. these combinations seek to preserve the integrity and transparency necessary for a reliable electoral system and at the same time address the privacy issues related to blockchain-based voting [12].Despite recent advancements, a thorough and generally acknowledged solution to the issue of voter fraud is still unresolved [10] the literature places emphasis on the significance of taking a comprehensive approach to the implementation of safe and reliable voting systems, considering not only technological characteristics but also the social, political, and legal dimensions. In addition to the current conversation, this paper broadens the understandings from earlier studies to provide a workable and novel response to the problems presented by voting fraud within the framework of contemporary democratic systems. it also demonstrates the acceptance of blockchain technology among the general mass through referendum by google survey. the outcome of the survey is a testament to the public’s eagerness to move away from the traditional approaches of elections and election fairness by selecting a novel approach i.e. blockchain methods. The public was perhaps convinced by the decentralization characteristics of this state-of-the-art method that addresses the weakness of centralized systems. in conventional electoral methods, a single point of failure, such as a centralized database, can be exploited by malicious actors such as hackers. blockchain, being decentralized, distributes the voting data across a network of nodes [7]. this makes it significantly more difficult for any single entity to manipulate the results, enhancing the overall security of the election. Once such fascinational ascpect of blockchain which often is not discussed is it’s immutability. a vote cannot be changed or removed after it has been recorded because to blockchain's immutability. this feature offers an auditable trail of all transactions and stops unauthorized alterations to the vote data [4]. it increases the electoral process's legitimacy by providing a safe, unchangeable record of every vote cast. Notwithstanding blockchain's potential to stop voter fraud and maintain election integrity, there are still issues and worries. it is imperative to tackle concerns pertaining to scalability, accessibility, and the possibility of emerging forms of digital inequality [13]. Furthermore, with a blockchain-based election system, safeguarding the cryptographic keys and fending off novel cyberthreats become crucial. The important step in improving the security and openness of voting processes is the use of blockchain technology to avoid voter fraud and election tampering. nations may fortify their democratic processes and restore public confidence in the electoral process by utilizing the decentralized, transparent, and unchangeable characteristics of blockchain technology [6] even though there are still difficulties, blockchain technology has enormous potential benefits that far outweigh the disadvantages, making it a powerful ally in the continuous fight to protect free and fair elections—the cornerstone of democracy.

* 1. Accessibility

Following the guidelines throughout this template will also improve the accessibility of your manuscript and increase the audience for your work. Ensure that heading styles are applied as instructed, tables are created using Word’s table feature (rather than an image), figures have a text equivalent, and list styles are applied as instructed.

To increase the accessibility of your manuscript, you should set the title and language metadata. On Word for Windows, open the File tab and click on Info. On Word for Mac, click the File Menu and select Properties, then click the Summary tab. Fill in the title of your document. For anonymous review, clear the ‘author’ field.

To set the document language, click the Review tab in the Ribbon. On Word for Windows: Click the Language button and select “Set Proofing Language.” Verify the language is set correctly. On Word for Mac: Click the Language button and select the document language from the pop-up.

* 1. More about the submission template

Thissubmission version of your paper should not have headers or footers, these will be added when your manuscript is processed after acceptance. It should remain in a one-column format—please do not alter any of the styles or margins.

*If a paper is accepted for publication*, authors will be instructed on the next steps. Authors must then follow the submission instructions found on their respective publication’s web page. Once your submission is received, your paper will be processed to produce the formatted Word, PDF, and HTML5 output formats, which will be provided to you for review, revision/resubmission (if applicable), and approval.

* 1. Inserting CCS concepts

The new template enables you to import required indexing concepts for your article from the [ACM Computing Classification System (CCS)](http://www.acm.org/publications/class-2012) using an [indexing support tool](http://dl.acm.org/ccs/ccs.cfm?) found in the ACM Digital Library (DL). The tool generates formatted text after you have selected your terms. To insert CCS terms into your document, copy and paste the formatted text from the CCS tool using the “<https://dl.acm.org/ccs/ccs.cfm>” link into the “CCS CONCEPTS” section.

An additional step is necessary to ensure that the proper CCS terms are added to the Digital Library citation page: from the “view CCS TeX Code” listing, click on “Show the XML Only.” Highlight and copy the XML code from the window. You must insert the XML code into your Word document’s properties: from your Word document, click on “**File**”, then click on the “**Info**” tab on the left-hand side panel, then click “**Properties**” and select “**Show All Properties.**” Click within the “Comments” metadata field and paste the XML data.

1. Inserting Content Elements

The next subsections provide instructions on how to insert figures, tables, and equations in your document.

* 1. Tables

Tables are “float elements” which should be inserted after their first text reference and have specific styles for identification. Do not use images to present tables, or they will be inaccessible to readers using assistive technologies.

Authors can insert tables by using the MS Word option (INSERT ->Table) and providing the required row and column size. Every table must have a caption (title) above it, which must have the **“TableCaption**” style applied. Please note that tables **should not** be supplied as image files, but if they are images they must have the “Image” style applied. As an example, Table 1 shows all the styles available in this template, to be applied to the respective element of your text.

Table 1: Styles available in the Word template

| Style Tag | Definition | Style Tag | Definition |
| --- | --- | --- | --- |
| Title\_document | main title of article | ListParagraph | list items |
| Subtitle | subtitle of article | Statements | math statements |
| Authors | author name | Extract | block quotations |
| Affiliation | author affiliation information | Algorithm Caption | caption for algorithm |
| AuthNotes | footnote to author(s) | AckHead | heading for acknowledgements |
| Abstract | abstract text | AckPara | acknowledgements text |
| CCSHead | heading for CSS Concepts | GrantSponsor | sponsor of grant |
| CCSDescription | CSS terms | GrantNumber | number for the grant |
| KeyWordHead | heading for keywords | ReferenceHead | heading for references |
| Keywords | keywords text | Bib\_entry | references |
| ORCID | author's ORCHID # | AppendixH1 | appendix heading level 1 |
| Head1 | heading level 1 | AppendixH2 | appendix heading level 2 |
| Head2 | heading level 2 | AppendixH3 | appendix heading level 3 |
| Head3 | heading level 3 | TableCaption | title of table |
| PostHeadPara | first paragraph after a heading | TableHead  TableFootnote | column head of table  footnote to table |
| Para | Subsequent paragraphs of general text | Image | figures |
| ParaContinue  DisplayFormula | flush left text after display items like math equations, lists etc.  numbered math equation | DOI | Digital object identifier |
| DisplayFormulaUnnum | unnumbered equations | Label | labela |
| ComputerCode | Display Computer codes | In-text code | intext computer code |
| Short Title | Short title of article | History | Dates of article |

a This is example of table footnote.

Tables can be very difficult for people using screen reader technology to understand unless they include markup that explicitly defines the relationships between all the parts (i.e.: headers and data cells). *A key to making data tables accessible to screen reader users is to clearly identify column and row headers.* In Word, authors should identify which row or rows contain column headers. Below are the steps to do this:

1. Select that table’s row, then right-click the row and select “Table Properties”;
2. In the *Table Properties* window, click the *Row* tab and select the box that says “Repeat as header row at the top of each page.”

Or

Apply the “table head” style by highlighting the respective row and applying the “**TableHead**” style found in the “Body Element” section of the ACM Master Article Template.

* 1. Figures

Figures are “float elements” which should be inserted after their first text reference, and have specific styles for identification. Insert a figure and apply the “**Image**” paragraph style to it. For the figure caption, apply the style “**FigureCaption.**”

To accommodate readers with color vision differences, figures should still be usable when printed in grayscale. Refer to elements of the figure with non-color terms, for example “indicated as squares” instead of “indicated in blue”. Use different patterns in bar charts, different line patterns in graphs, and different shapes in plots to distinguish groups of elements and reinforce color differences.

* + 1. Half Width Figures.

Figure 1 is an example of a figure and caption spanning the half-page width (one column in a two column format) with the styles applied. If your figure contains third-party material, you must clearly identify it as such, as shown in the example below.



Figure 1: 1907 Franklin Model D roadster. Photograph by Harris & Ewing, Inc. [Public domain], via Wikimedia Commons. (https://goo.gl/VLCRBB)

* + 1. Full Width Figures.

Figure 2 is an example of a figure and caption spanning the full-page width with the styles applied. If your figure contains third-party material, you must clearly identify it as such, as shown in the examples.



Figure 2: Mockup of a bombe machine at Bletchley Part. Photograph by Sarah Hartwell. [Public domain], via Wikimedia Commons. (<https://commons.wikimedia.org/wiki/File:TuringBombeBletchleyPark.jpg>)

* + 1. Multi-part figure.

Authors can also insert a multi-part figure above a single caption. Every inserted figure must have the “Image” style applied. Below are instructions regarding how to insert a multi-part figure in your paper.

* If the author wants to insert two multi-part images, they must draw a one row and one column table and insert the images one-by-one in the cells.
* If the author wants to insert three multi-part images, they must draw a one-row and three-column table and insert the images one by one in all three cells.
* If the author wants to insert four multi-part images, they must draw a two-row and two-column table and insert the images one-by-one in all four cells. (see the following example):

| Figure 2: The layout of multipart images should be as per the above example within the table in image 1. | Figure 2: The layout of multipart images should be as per the above example within the table in image 2. |
| --- | --- |
| Figure 2: The layout of multipart images should be as per the above example within the table in image 3. | Figure 2: The layout of multipart images should be as per the above example within the table in image 4. |

Figure 3: The layout of multipart images should be as per the above example within the table. All images must have the “Image” style applied.

* + 1. Figure Descriptions.

Every figure should have a figure description unless it is purely decorative. These descriptions convey what’s in the image to someone who cannot see it. They are also used by search engine crawlers for indexing images, and when images cannot be loaded.

A figure description must be unformatted plain text less than xxx characters long. Figure descriptions should not repeat the figure caption – their purpose is to capture important information that is not already provided in the caption or the main text of the paper. For figures that convey important and complex new information, a short plain text description may not be adequate. More complex alternative descriptions can be placed in an appendix and referenced in a short figure description. For example, provide a data table capturing the information in a bar chart, or a structured list representing a graph. For additional information regarding how best to write figure descriptions and why doing this is so important, please see [https://www.acm.org/accessibility.](https://www.acm.org/accessibility)

The instructions below describe the required steps authors need to follow in order to insert descriptive text for figures (alt-txt value) in **MS Word 2019 on Windows or Word 2016 and later on Mac**:

1. Insert a picture in the document.
2. Right-click the image and select “Edit Alt Text”.
3. In the “alt text” section, provide your text description of the image.

Below are the steps to insert figure descriptions in **MS Word 2013 and 2016**:

1. Insert a picture in the document.
2. Right click on the inserted picture and select the **Format Picture** option.
3. In the settings at the right side of the window, click on the “Layout & Properties” icon (3rd option).
4. Expand **Alt Txt** option.
5. In the “Title” and “Description” text boxes, type the text you want to represent the figure, and then click “Close.”

Below are steps to insert the alt-txt value in **MS Word 2010/2011 for Windows\***:

1. Insert a picture in the document.
2. Right click on the inserted picture and select the **Format Picture** option.
3. Select the **Alt Txt** option from the left-side panel options.
4. In the “Title” and “Description” text boxes, type the text you want to represent the picture, and then click “Close.”  
   \* The Mac 2011 version 14.0.0 and later allows the option for inserting “alt-text.” In the MAC version of Word 2016, right-click on the image and select “Edit Alt Text” from the pop-up menu and then enter the description for the alt text.
   1. Quotations and Extracts

There are styles for block quotations, which should be used for quotes that are separated from in-line text. Below is an example.

“Microsoft tried to revive the idea of an assistant with Clippy, who began popping up in Microsoft Office in 1997. Its creator, Kevan Atteberry, was actually contracted by Microsoft to design Clippy, which, funnily enough, he did on a Mac … Sure, people could disable Clippy, but the fact he was on by default angered people.” [10]

* 1. Equations

There are two types of math equations: the *numbered display math equation* and the *un-numbered display math equation*. Below are examples of both.

* + 1. DisplayFormula.

The **DisplayFormula** style is applied in the numbered math equation. A numbered display equation always has an equation number (label) on the right.

(1)

* + 1. DisplayFormula.Unnum.

The **DisplayFormulaUnnum** style is applied only in unnumbered equations. An unnumbered display equation never contains an equation number Bertot and Grimes (2012) on the right—this element distinguishes it from the numbered equation.

Please note: the subsequent text after the **DisplayFormula** (numbered equation) or **DisplayFormulaUnnum** (unnumbered equation) must have the paragraph style **ParaContinue** applied.

* 1. Math statements

Math statements should have the “Statement” style applied.

**Theorem/Proof/Lemma.** Math statements should have the “**Statement**” style applied. This paragraph is an example of the “**Statement**” style.

* 1. Algorithms

Algorithms use the styles “AlgorithmCaption” and “Algorithm”.

ALGORITHM 1: Iterative Algorithm

current\_position center

current\_direction up

current\_position is inside circle

while current\_position is inside circle, do

neighborhood all grid hexes within two hexes from current\_position

for each hex in neighborhood, do

for each neuron in hex do

convert neuron\_orientation to vector

scale vector by neuron\_excitation

vector\_sum vector\_sum + vector

end

end

normalize vector\_sum

end

1. COMPUTER CODE

Display Computer codes can be inserted using “ComputerCode” style.

CHAT Start

SAY Welcome to my world

WAIT 1.2

SAY Thanks for Visiting

ASK Do you want to play a game?

OPT Sure

OPT No Thanks

Similary, this is an example of intext code text.

Similary, this is an example of intext code text.

1. Citing Related Work

This section cites a variety of journal [5, 15], conference [1, 6, 8, 12, 13], and magazine [3] articles to illustrate how they appear in the references section. It also cites books [9, 10], a technical report [7], a PhD dissertation [4], an online reference [14], a software artifact [11], and a dataset [2].

As you build your article, you should note where you will be placing citations. If you are using numbered citations and references, the reference number - "...as shown in [5]..." is sufficient. If you are using the "author year" style, a reasonable placeholder is the primary author's last name and the year of publication - "...as shown in [Harel 1978]..." - we will be updating this placeholder later in the process with the citation label as generated by the Word macros in the "master template.

ACKNOWLEDGMENTS

Acknowledgments are placed before the references. Add information about grants, awards, or other types of funding that you have received to support your research. Author can capture the **grant sponsor information**, by selecting the grant sponsor text and apply style ‘GrantSponsor’. After this, select grant no and apply ‘GrantNumber’ from style panel. Example of Grant sponsor: Competitive Research Programme and example of Grant no: CRP 10-2012-03.

1. HISTORY DATES

In case of submissions being prepared for Journals or PACMs, please add history dates after References as (*please note revised date is optional*):

Received November 2019; revised August 2020; accepted December 2020

REFERENCES

1. Patil, H. V., Rathi, K. G., & Tribhuwan, M. V. (2018). "A Study on Decentralized E-Voting System Using Blockchain Technology." International Research Journal of Engineering and Technology (IRJET) Volume: 05 Issue: 11. <https://d1wqtxts1xzle7.cloudfront.net/57934860/IRJET-V5I1109-libre.pdf?1544080333=&response-content-disposition=inline%3B+filename%3DIRJET_A_Study_on_Decentralized_E_Voting.pdf&Expires=1700231534&Signature=c4YW~RnhXWU77bOyBD~QO~fonhG5wkx2sHXY43cYnycTyds8rIouTLdRMjRpeB08I2qy3uTkkdijkJvA71~cDUu6AyLyF9PQ9THTsZHPxsxbuERW4xoltahLFjXSz7J0qjwre7f7TicekBDShnkpkFB6tdmNu4gqWLyVz~UfwYLgAeZmVKaut8BH1jsfNWHJarlPa3cUZEskCNjNvEYKs-XG4KoQhJLF6OectTH12EsdaUxsNXILxPhI7z~msPP-qJYO88VP0aUFiqZ9NS1OTNwD8~ZN8UdE-LWJJeN9M3pdMgoMsU5apyYmlNxaeMNcncZddSEmSHh2wMEZ~ZuOfw__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA>
2. G. Srivastava, A. D. Dwivedi, and R. Singh(2018), "Crypto-democracy: A Decentralized Voting Scheme using Blockchain Technology," Brandon University, Canada, Polish Academy of Sciences, Poland & University of Warsaw, Poland. <https://www.scitepress.org/Papers/2018/68819/68819.pdf>
3. Abgesi, S., & Asante, G. (2019). "Electronic voting recording system based on blockchain technology." 12th CMI Conference on Cybersecurity and Privacy (CMI). <https://ieeexplore.ieee.org/abstract/document/8962142>
4. Cooley, R., Wolf, S., & Borowczak, M. (2018). "Blockchain-based election infrastructures." IEEE International Smart Cities Conference (ISC2). <https://ieeexplore.ieee.org/abstract/document/8656988>
5. Al-Madani, A. M., Gaikwad, A. T., Mahale, V., & Ahmed, Z. A. T. (2020). "Decentralized E-voting system based on Smart Contract by using Blockchain Technology." International Conference on Smart Innovations in Design, Environment, Management, Planning and Computing (ICSIDEMPC). <https://ieeexplore.ieee.org/abstract/document/9299581>
6. Basit Shehzad, Jon Crowcroft (2019). “Trustworthy Electronic Voting Using Adjusted Blockchain Technology”. In proceedings of the 2019 4th International Conference on Information Technology, Information Systems and Electrical Engineering (ICITISEE). <https://ieeexplore.ieee.org/abstract/document/8651451/authors#authors>
7. Donny Seftyanto, Amiruddin Amiruddin, Arif Rahman Hakim.” Design of Blockchain-Based Electronic Election System Using Hyperledger: Case of Indonesia” In proceedings of the 2019 4th International Conference on Information Technology, Information Systems and Electrical Engineering (ICITISEE). <https://ieeexplore.ieee.org/abstract/document/9003768/>
8. Hegadekatti, Kartik, Analysis of Present Day Election Processes vis-à-vis Elections Through Blockchain Technology (January 24, 2017). Available at SSRN: https://ssrn.com/abstract=2904868 or <http://dx.doi.org/10.2139/ssrn.2904868>.
9. BOUCHER, P., 2016. What if blockchain technology revolutionised voting?, EPRS: European Parliamentary Research Service. Belgium. <https://policycommons.net/artifacts/1340513/what-if-blockchain-technology-revolutionised-voting/1951084/>
10. Patricia Baudier, Galina Kondrateva, Chantal Ammi, Eric Seulliet, Peace engineering: The contribution of blockchain systems to the e- voting process, Technological Forecasting and Social Change,Volume 162,2021,120397, ISSN 0040-1625, <https://www.sciencedirect.com/science/article/pii/S0040162520312233?via%3Dihub>
11. Baocheng Wang, Jiawei Sun, Yunhua He, Dandan Pang, Ningxiao Lu, Large-scale Election Based On Blockchain,Procedia Computer Science, Volume 129,2018, Pages 234-237, ISSN 1877-0509, <https://www.sciencedirect.com/science/article/pii/S1877050918302874>
12. I. -M. Stan, I. -C. Barac and D. Rosner, "Architecting a scalable e-election system using Blockchain technologies," 2021 20th RoEduNet Conference: Networking in Education and Research (RoEduNet), Iasi, Romania, 2021. <https://ieeexplore.ieee.org/abstract/document/9638303>
13. Raikar, D., & Vatsa, A. (2021). BCT-Voting: A Blockchain Technology Based Voting System. In *The 27 th International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA’21), July* (pp. 26-29). <https://www.researchgate.net/profile/Avimanyou-Vatsa-2/publication/353634727_BCT-Voting_A_Blockchain_Technology_Based_Voting_System/links/61075ef4169a1a0103cf7966/BCT-Voting-A-Blockchain-Technology-Based-Voting-System.pdf>
14. Bogucki, B., 2017. Buying Votes in the 21st Century: The Potential Use of Bitcoins and Blockchain Technology in Electronic Voting Reform. *Asper Rev. Int'l Bus. & Trade L.*, *17*, p.59. <https://heinonline.org/HOL/LandingPage?handle=hein.journals/asperv17&div=6&id=&page=>

A  APPENDICES

In the appendix section, three levels of Appendix headings are available.

A.1 General Guidelines (AppendixH2)

1. Save as you go and backup your file regularly.
2. Do not work on files that are saved in a cloud directory. To avoid problems such as MS Word crashing, please only work on files that are saved locally on your machine.
3. Equations should be created with the built-in Microsoft® Equation Editor included with your version of Word. (Please check the compatibility at <http://tinyurl.com/lzny753> for using MathType.)
4. Please save all files in DOCX format, as the DOC format is only supported for the Mac 2011 version.
5. Tables should be created with Word’s “Insert Table” tool and placed within your document. (Tables created with spaces or tabs will have problems being properly typeset. To ensure your table is published correctly, Word’s table tool must be used.)
6. Do not copy-and-paste elements into the submission document from Excel such as charts and tables.
7. Footnotes should be inserted using Word’s “Insert Footnote” feature.
8. Do not use Word’s “Insert Shape” function to create diagrams, etc.
9. Do not have references appear in a table/cells format as it will produce an error during the layout generation process.
10. MS Word does not consistently allow the original formatting to be modified in the text. In these cases, it is best to copy all the document’s text from the specific file and paste into a new MS Word document and then save it.
11. At times there are font problems such as “odd” stuff/junk characters that appear in the text, usually in the references. This can be caused by a variety of reasons such as copying-and-pasting from another file, file transfers, etc. Please review your text prior to submission to make sure it reads correctly.

A.1.1 Preparing Graphics (AppendixH3)

1. Accepted image file formats: TIFF (.tif), JPEG (.jpg).
2. Scalable vector formats (i.e., SVG, EPS and PS) are greatly preferred.
3. Application files (e.g., Corel Draw, MS Word, MS Excel, PPT, etc.) are NOT recommended.
4. Images created in Microsoft Word using text-box, shapes, clip-art are NOT recommended.
5. IMPORTANT: All fonts must be embedded in your figure files.
6. Set the correct orientation for each graphics file.

A.2 Placeholder Text

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Vulputate sapien nec sagittis aliquam. Malesuada fames ac turpis egestas sed tempus urna. Posuere sollicitudin aliquam ultrices sagittis orci. Consequat id porta nibh venenatis cras sed felis eget. Pellentesque eu tincidunt tortor aliquam nulla facilisi cras fermentum odio. Tincidunt nunc pulvinar sapien et ligula ullamcorper malesuada proin. Tincidunt lobortis feugiat vivamus at augue. Eget nunc lobortis mattis aliquam faucibus. Egestas diam in arcu cursus euismod quis.

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