Title of Research Abstract to be presented at the
GWU SEAS Research and Design Showcase

Names of Authors should be centered, typed in lowercase (12pt) and marked with numbers\textsuperscript{1,2,3}, etc., according to the names of department and institutions (10pt)

Corresponding Author’s name should be additionally marked with an asterisk\textsuperscript{1,*} and its e-mail account should be included. (10pt)

I. GENERAL LAYOUT OF THE TWO-PAGE ABSTRACT

Please prepare the camera-ready copy on regular size paper (8.5in x 11in = 21.6cm x27.9cm). The digest should be prepared in double-column format. The total text height should be 9.6in (24.4cm). The total width should be 7.2in (18.3cm) with a separation of 0.2in (0.5cm) between the columns. Please provide a top margin of 0.7in (1.8cm) and a left margin of 0.65in (1.65cm). Paragraphs follow the indented paragraph format with left and right justification. Use 0.2in (0.5cm) for paragraph indentation. Don’t leave space between the paragraphs.

Please number section headings with Roman numerals and center them in column. The spacing before and after the section headings should be 12pt and 4pt, respectively. Please number the subheadings with alphabetical letters. The spacing before and after the subheadings is 6pt and 3pt, respectively. The indentation for subheadings is 0.11in.

II. TYPE AND SIZE OF FONTS

Please use Times New Roman typeface and following the type size specified in Table I as closely as possible.

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III. USEFUL HINTS

A. Abstract format

Specific sections are not required for the two-page abstract. Most fields of engineering and science, at a minimum, will have sections that include an Introduction, Methods, Results, Discussion, and Conclusions. Regardless of any particular format, readers should be able to quickly identify the following information:

1) Research Question: Clearly state the research question addressed in the work at a level that can be understood by a person with a general technical background who is not necessarily an expert in the field.

2) Motivation for the Research: Explain why it is important for this research to be conducted. It may start as: “This research is important because …”

3) Research Method/Approach: Clearly state and summarize the research method/approach employed by the research team to solve this problem.

4) Research Results: Describe the results of the research and the primary insight provided by these results.

5) Research Conclusion: State your overall conclusion for the project and the next steps (if any) in this study.

B. Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CCG, ac, and dc do not have to be defined. Don’t use abbreviations in the title unless they are unavoidable (for example, the title of this article).

C. Figures and tables

Figures and tables should be placed in the middle of columns. Figure captions should be centered below the figures; table captions should be centered above the tables. Please use words rather than symbols to label the axis. As an example, write the quantity “Magnetization,” or “Magnetization, \( M \),” not just “\( M \).” Put units in parentheses. Do not label axes only with units. As in Fig. 1, for example, write “Magnetization (A/m)” or “Magnetization (A \( \cdot \) m\(^{-1}\)),” not just “A/m.” Do not label axes with a ratio of quantities and units. For example, write “Temperature (K),” not “Temperature/K.” Multipliers can be especially confusing. Write “Magnetization (kA/m)” or “Magnetization (10\(^3\)A/m).” Do not write “Magnetization (A/m \( \times \) 1000)” because the readers would not know whether the top axis label in Fig. 1 meant 15000A/m or 0.015A/m.

Figure labels should be legible, approximately 8 to 12 point type when reduced to column width. Note that “Fig.” is
abbreviated. There is a period after the figure number, followed by two spaces.

Fig. 1. Magnetization as a function of applied field

D. Equations

Use either the Microsoft Equation Editor or the MathType add-on for equations in your digests. Number equations consecutively with equation numbers in parentheses flush with the right margin, as in (1). First use the equation editor to create the equation. Then select the “Equation” markup style. Press the tab key and write the equation number in parentheses. To make your equation more compact, you may use the solidus (/), the exp function, or appropriate exponents. Use parentheses to avoid ambiguities in denominators. Punctuate equations when they are part of a sentence, as in

\[ B_x = \frac{\partial A}{\partial y} = \frac{1}{2\Delta_e}(\eta_1 A_1 + \eta_2 A_2 + \eta_3 A_3) \]  

(1)

Be sure that the symbols in your equation have been defined before the equation appears or immediately following. Refer to “(1),” not “Eq. (1)” or “equation (1)” except at the beginning of a sentence: “Equation (1) is…”

Please confine equations to one column width and break equations at appropriate algebraic symbols.

E. Units

Use either SI (MKS) or CGS as primary units. SI units are strongly recommended. Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. If you must use mixed units, clearly state the units for each quantity in an equation.

F. Conclusion

A conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract in the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

G. References

Number citations consecutively in square brackets [1]. The sentence punctuation follows the brackets [2]. Multiple references [2], [3] are each numbered with separate brackets [2]-[3]. When citing a section in a book, please give the relevant page numbers [2]. In sentences, refer simply to the reference number, as in [3]. Do not use “Ref. [3]” or “reference [3]” except at the beginning of a sentence. Papers that have not been published should be cited as “unpublished” [4]. Papers that have been submitted for publication should be cited as “submitted for publication” [5]. Paper that have been accepted for publication but not yet specified for an issue should be cited as “to be published” [6]. Please give affiliations and address for private communications [7].

Use a space after authors’ initials. Capitalize only the first word in a paper title, except for proper nouns and element symbols. If you are short of space, you may omit paper titles.

H. Language

The use of a grammar and spelling checker is strongly recommended. It is also suggested that you get the digest proofread by a native English-speaking colleague if your native language is not English.

I. Additional Information

Other information related to writing an abstract is provided online: “How to Write an Abstract” by Philip Koopman, Carnegie Mellon University, October 1997. Please refer to http://www.ece.cmu.edu/~koopman/essays/abstract.html for a more complete description of Philip Koopman’s discussion and guidance as you design and author your research abstract.

IV. REFERENCES