ABSTRACT

Title of Your Dissertation

John G. Student, Ph.D.

Mentor: Chairperson Name, Ph.D.

The work presented in this dissertation...

Essential Elements of Proton Computed Tomography for Practical Applications

by

Blake Edward Schultze, B.S., M.S.

A Dissertation

Approved by the Department of Electrical and Computer Engineering

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Kwang Y. Lee, Ph.D., Chairperson

Submitted to the Graduate Faculty of
Baylor University in Partial Fulfillment of the
Requirements for the Degree
of

Doctor of Philosophy

Approved by the Dissertation Committee

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Keith E. Schubert, Ph.D., Chairperson

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Accepted by the Graduate School

August 2021

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J. Larry Lyon, Ph.D., Dean

Page bearing signatures is kept on file in the Graduate School.

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ACKNOWLEDGMENTS

Special thanks go to...

ATTRIBUTIONS

(1) B. E. Schultze, M. Witt, Y. Censor, K. E. Schubert, and R. W. Schulte, "Performance of hull-detection algorithms for proton computed tomography reconstruction," in *Infinite Products of Operators and Their Applications*, ser. Contemporary Mathematics, S. Reich and A. Zaslavski, Eds., vol. 636. American Mathematical Society, 2015, pp. 211–224.

- I (B. E. Schultze) was the sole investigator and primary author of the publication.
- M. Witt provided the simulated data sets used for the initial hull-detection investigations.
- Y. Censor, K. E. Schubert, and R. W. Schulte acted in a supervisory role on editing, content accuracy, and approval of the final form submitted for publication.

(2) B. E. Schultze, Y. Censor, P. Karbasi, K. E. Schubert, and R. W. Schulte, "An Improved Method of Total Variation Superiorization Applied to Reconstruction in Proton Computed Tomography," *IEEE Transactions on Medical Imaging*, vol. 39, no. 2, pp. 294–307, 2020

- I (B. E. Schultze) was the sole investigator and primary author of the publication.
- Y. Censor is among the original developers of the superiorization methodology, which serves as the theoretical framework of total variation superiorization, and requested the investigations be performed for pCT. He also provided approval of the investigation results and final form submitted for publication.
- P. Karbasi was a colleague working independently on a related topic who participated in discussions to ensure our investigations did not overlap. She also assisted in the editing of the final form submitted for publication.
- K. E. Schubert and R. W. Schulte acted in a supervisory role on editing, content accuracy, and approval of the final form submitted for publication.

CHAPTER ONE

Introduction

Overview of dissertation: motivation, the reason more work is needed, the importance of your work and how it addresses this need, and a topical overview of what will be presented in the following chapters.

CHAPTER TWO

Historical Review and Literature Survey

Present history of the research in your field/topic and an overview of the published literature relevant to this work. Prove that you are knowledgable about the existing literature in your field/topic so you can show why what you have done truly is new and important and represents a worthwhile contribution to the advancement of this field/topic.

NOTE: This may be broken into two chapters.

CHAPTER THREE

Methods

Present what you did and how. May be a single Methods Chapter, or separate Methods Sections if separate topics of your dissertation are each presented as individual chapters. Alternatively, if there are methods that are relevant to all your topics, as well as methods germane to each topic individually, there might be a separate Methods Chapter here as well as Methods Sections in each topical Chapter. Cite your work where applicable [1]. **NOTE:** This may be broken into two chapters.

APPENDIX THREE

Explicit Subappendix Title (capitalized)

Subappendix relevant to Chapter 3 content. Material segmentation by instead of by like back matter appendices.

The subappendices must have a level 2 title heading, which can be defined in the first parameter of the command (as is the case here) or defaults to “Chapter title: Supplemental Information”if this parameter is empty. The title is automatically capitalized.

3.A First Section

3.B Second Section

CHAPTER FOUR

Results

Present the results generated using the new methods you have developed and presented here. Again, you may choose to forego a Results Chapter in favor of presenting Results Sections when individual topics of your dissertation are provided as separate chapters. In such cases, you will likely have Methods, Results and potentially Summary/Conclusion Sections in each chapter.

It is theoretically possible you may not only have Methods that are applicable to every presented (chapter) topic, but you may also have results that are applicable to every presented (chapter) topic. In that case, you could have separate Methods/Results Chapters as well as Methods/Results Sections in each Topical Chapter; the order in which the Results Chapter is included in this scenario depends on the particular scenario.

APPENDIX FOUR

Results: Supplemental Information

Subappendix relevant to Chapter 4 content. In this case, the empty command results in the default subappendix title "Results: Supplemental Information".

4.A First Section

4.B Second Section

CHAPTER FIVE

Summary

Summarize and discuss results from each topic and their collective impact/importance on the field/topic. Alternatively, the summary may be combined with the conclusions to form a single Conclusion chapter.

CHAPTER SIX

Conclusion

Provide final remarks and conclusions about the success of your work, it's contribution to the overall field/topic, and a forecast of it's importance and possible directions for future research in the particular areas presented here and/or the general field/topic.

BIBLIOGRAPHY

[1] J. G. Student, “Some important work,” *Prestigous Journal*, vol. 1, no. 1, pp. 141–156, Jan 2000.