

# Preface

This book is an attempt at a comprehensive treatment of those medical imaging techniques commonly referred to as Computed Tomography (CT) and sometimes known as Computerised Tomography, which rely on X-rays for their action. As this is a place to explain my reasons for writing the book, I would like to begin by assuring the reader of my passion for the medical technology discussed here. My main motivation in publishing this work was a desire to share with the widest possible readership my fascination with the topic. I would expect the target audience for this account to be primarily academics, students and technicians involved with biomedical engineering, as well as doctors and medical technicians concerned with medical imaging. The structure and content of the book place particular emphasis on issues related to the reconstruction of images from projections, a key problem in tomography. This reflects my area of interest in the field. Other problems will be treated as technical and physical background to the reconstruction algorithms, in so far as is necessary for an understanding of how they work (and perhaps a little more). The reconstruction algorithms covered relate to all the basic designs of tomographic equipment, from the first Hounsfield scanner to the most recent spiral CT devices for reconstructing images in three dimensions. I hope that the summaries of various practical implementations of the algorithms will help people to test the individual reconstruction methods for themselves. The final chapter contains an account of a virtual test environment so that those without access to physical measurement data from a real scanner can carry out these tests. Perhaps it is a good point here to wish you the best of luck.

There is another reason for engaging the reader at this point, in addition to spreading enthusiasm for the subject. It is to thank those particularly who have made significant contributions to the conception of “the work”. I would like to start with my lecturer Professor Ryszard Tadeusiewicz. It was at his lecture that I first heard about the reconstruction problem. It was then, perhaps thanks to his eloquence, that I was quite simply struck by the “beauty” of the problem. The second person who, in my academic life, had a decisive influence on the direction of my research was Professor Leszek Rutkowski. He, as my academic supervisor, always gave me enough freedom to choose the direction of my own interests.

However, I also cannot forget those individuals and institutions that, during the writing of this monograph, enabled me to bring the project to fruition. Amongst these I would like to stress the contribution of Dr. Marek Waligóra from the Private Health Care Group “Unimed” in Częstochowa, who provided me with the tomographic images contained in the book, and offered advice on all contentious medical issues. I would like to thank Mr Marcin Gabryel for his assistance in preparing the program listings included in the book. These should prove very useful to those wishing to test the reconstruction algorithms described here. I would also like to offer my special thanks to Japan Industries Association of Radiological Systems (JIRA) and Sumio Makino for allowing the publication of historical photographs related to the development of computed tomography techniques. A significant role was also played by Ms. Claire Protherough, on behalf of Springer Publishing. She showed great patience with such an ill-disciplined author as myself and took such care during the editorial work on the publication. This book would probably not have arisen at all without Mike Butynski, who not only translated the text from the Polish language but also, thanks to his physics background, helped me with many of the basic problems that arose during the writing of this monograph. Thank you, Mike, for the heart that you put into the book. To others not mentioned here by name, but who helped with this work, I apologise and ask for understanding.

In conclusion, I would like to hope, dear reader, that you are willing to spare the book a moment of your attention and not regard it as time ill spent.

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Robert Cierniak



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Cierniak, R.

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