



Foreword

»Why, sometimes I've believed as many as six impossible things before breakfast.«

The White Queen
in Lewis Carroll's *Alice Through the Looking Glass*.

Here we go again — in less than two years the last edition of this textbook has been sold out. We have revised it and made a fifth edition.

In magnetic resonance (MR) imaging beginners and even the more knowledgeable often have to believe what they read or hear about the topic — and often things seem to be impossible. Sometimes it seems like a fairy tale. This book tries to tell the tale and lead its readers from believing to understanding.

Readers should be able to acquire a basic knowledge which enables them to pursue studies of their own and to cope with some of the most common problems, such as image contrast and artifacts or questions concerning possible hazards to patients. The main author and the contributors have not attempted to cover the field completely nor to be exhaustive in the topics discussed, as the field of magnetic resonance is in a permanent stage of development and therefore changing day by day.

The intention of this book is rather to lead the readers to a fundamental understanding to be able to explore the details and new developments by themselves.

The first version of this book was written in 1982 and published by the University of Mons Press. It was intended to be used as the primer for the first European Workshop on Magnetic Resonance in Medicine and later the European Magnetic Resonance Forum to teach the basics and some of the applications of MR imaging and MR spectroscopy. Many organizers of other teaching courses and universities the world over have found it valuable for their students.

After Paul C. Lauterbur, the father of MR imaging, saw the first edition of this book, he wrote back to us:

»It looks like a fine book, especially for residents, nurses, and technicians.«

Initially we thought this statement was not very encouraging, but in hindsight this was exactly what we had intended to write: an introduction for beginners.

The public reaction to and the reviews of the last editions were extremely positive. The book is very popular with radiologists, cardiologists, medical students and radiographers, who encouraged us to revise it again. For the fourth edition, the text and all the figures had been completely redone and new chapters have been added, this fifth edition has been brought up to the latest developments.

The text has been written in such a way that newcomers to the field will be provided with the concepts, explanations and illustrations necessary to master the basics of magnetic resonance in medicine.

As with everything in life, MR imaging does not only require knowledge of facts but also background information for decision making. Therefore we have included some subjective, critical, and opinion-oriented sections, intended to offset the technical nature of the book and provide some insights into more practical questions faced by MR users.

An addition is ***MR Image Expert***, an interactive learning and teaching tool for MR imaging, in particular for facilitating the understanding of MR image contrast. It simulates the most important aspects of MR imaging on a personal computer. Teaching tools such as textbooks and slide presentations are used to introduce the newcomer to the field, but the best teacher would be an MR imaging machine itself. However, learning by experience is time-consuming, expensive, and in cases with human pathology, impossible. Thus, the next best tool is an MR imaging simulator, a computer program which simulates an MRI machine without performing real examinations. ***MR Image Expert*** is such a simulator.

Dynalize is the second software included. It allows the presentation and analysis of dynamic MR imaging studies.

One problem has increased during recent years: differences between the equipment of manufacturers. Some manufacturers have even developed their own specialized terminology which is only applicable to their machines. No standardization seems to be envisaged. We have tried to explain the most common techniques which have been implemented in most machines and have focused upon the basics. We have left the bulk of applications in medicine to others who have written outstanding books on applications in many medical disciplines.

We are grateful to Knut Nordli for his comments. Karen Janssen and Marc Kouwenhoven of Philips Medical Systems have kindly supplied a number of images for the angiography chapter.

All previous editions have been published in English, some of them having been translated into German, French, Italian, Polish, Russian, Spanish, and Japanese.

This edition will be published simultaneously in English, Russian, and Portuguese.

As always: if you find any mistakes in this book, rest assured that they were left intentionally so as not to provoke the gods with something which is perfect.

Anyway, we appreciate any comments concerning this book. Please forward them to the



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