BOOKS AND PUBLICATIONS

All interested medical physicists are encouraged to have their names added to a list of available reviewers. Please rank your interest among radiation therapy, x-ray, imaging, nuclear medicine imaging, ultrasound imaging, MR imaging, radiation injury, radiation protection, and others. Make your interest known to Dimitris Mihailidis, Ph.D., Books Review Editor (dimitris@charlestonradiation.com). Include your name and e-mail address in the body of the response.

Quantitative Analysis in Nuclear Medicine Imaging. Habib Zaidi. 538 pp., Springer-Verlag, New York, 2006. $125.00. ISBN 9780387238548.

DESCRIPTION

This book provides a recent survey on quantitative techniques in nuclear medicine that includes planar, SPECT, and PET imaging. It also gives details on specific applications of these methods especially related to radionuclide treatment planning.

PURPOSE

The purpose of the book was to provide a review of the methods required for quantitative nuclear medicine imaging and therapy. Quantitative nuclear medicine is a very important, sophisticated, and rapidly progressing field and there is a need for a book that combines recent information on physical compensation techniques and multimodality image analysis with current clinical applications. This book does exactly that.

AUDIENCE

This book is clearly written for image scientists and graduate students who are interested in radionuclide imaging. The book is technically complete and includes the integral equations required to model the physical imaging processes, tomographic reconstructions, and tracer kinetics. Dr. Zaidi is an expert authority in this field and he has gathered together an outstanding group of eminent scientists to write about these issues. Dr. Zaidi is not only the editor but also an author or co-author on 12 of the 18 chapters. This gives the book a pleasing continuity and accounts for the consistency in presentation and equations.

CONTENT/FEATURES

The book begins with a comprehensive review of the physics and instrumentation used in single photon and PET imaging. The next section of the book covers information that any serious imaging scientist working in the field needs to know including image reconstruction techniques, attenuation, scatter and spatial resolution compensation, and tracer kinetic modeling. Image segmentation and the registration of radionuclide volumetric data with other modalities is also covered along with a very useful summary of Monte Carlo and mathematical phantom resources. The final section of the book focuses on clinical and therapeutic applications. Too often PET dominates discussions of quantitative radionuclide imaging at the expense of SPECT, but in this book there is a very nice balance between these two radionuclide imaging modalities.

There are 110 illustrations in the book and each chapter has an abundance of relevant and recent references.

ASSESSMENT/COMPARISON

Overall I found this to be an outstanding book and it certainly belongs in the library of any serious imaging scientist.

Reviewed by Mark Madsen

Mark T. Madsen is a Professor of Radiology at the University of Iowa, expert in nuclear medical and diagnostic imaging physics. Over the years, he has been very active in AAPM where he is also a Fellow.

Biophotonics: Visions for Better Health Care. Editors: Jürgen Popp and Marion Strehle. 622 pp., ISBN 3-527-40622-0, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany, 2006. $165.00 (hardcover).

Edited by Dr. Popp and Dr. Strehle, *Biophotonics: Visions for Better Health Care* presents the research efforts of a three-year research program funded by the German government and contributed by 120 researchers including physicists, chemists, biologists, physicians and information experts. As one of the first books on this topic, it presents insights into the work and the real world applications of nine network projects on biophotonics activities in Germany. The 11 chapters cover a variety of topics on medical and biological problems, present sophisticated scientific solutions, and introduce innovative equipment based on principles of biophotonics.

The first chapter introduces the fairly new disciple of biophotonics that "deals with the interaction between light and biological systems." As most physicists are not too familiar with the topic, I find this chapter very helpful in providing an overview on the area of biophotonics. With a background in basic nuclear physics, general physicists will easily understand the topic, which deals with the same electromagnetic spectrum but in a lower frequency range than the typical diagnostic and therapeutic applications. Chapters 2 through 10 present real world applications with each chapter focusing on one particular topic. Each chapter starts with an introduction of problems and ends with sophisticated scientific solutions that are almost ready to market. A concise description of the scientific principles is explained in each chapter with the aid of well-illustrated diagrams and tables. Most of the developed systems using these new techniques try to achieve online or *in vivo* monitoring thanks to the nondestructive principle of photonics, which is a critical feature for studying biological problems. The last chapter presents future perspectives of biophotonics and includes several examples of future research activities. Biophotonics "is on the way to solving the most important problems in biology and medicine."

The chapters of most interest to clinical physicists are Chaps. 5 and 6, which describe new methods for early diagnosis of

Nuclear medicine images can be used for either detection tasks, such as identifying perfusion defects, or quantitative tasks, such as estimating ejection fraction, standardized uptake values (SUVs) or organ absorbed dose. Obtaining images that are suitable for quantitative tasks often requires additional processing compared with those used for visual interpretation.Â For example, the development of attenuation correction methods for cardiac single photon emission computed tomography (SPECT) has improved detection of myocardial perfusion defects, while at the same time providing images which are quantitatively more accurate. Many current applications that involve quantification of nuclear medicine images use relative quantification only.