Book Reviews, NIBIB, and IOM Breast Cancer Report

This editorial introduces Book Reviews as a new publication category for the IEEE TRANSACTIONS ON MEDICAL IMAGING (T-MI). Recent progress in establishment of the National Institutes of Health (NIH) National Institute of Biomedical Imaging and Bioengineering is summarized. An Institute of Medicine report on emerging technologies for breast cancer detection and screening is announced.

I. BOOK REVIEWS

Medical imaging methods and results are reported in journals, magazines, proceedings of meetings, and on the Internet. Medical imaging books introduce new concepts and applications, place them in context, and systematically summarize the current state-of-the-art as well as prior developments. A recent online search1 found 1077 books with the keyword “medical imaging,” and more than 130 of these were published in 2000. Clearly, there is an unmet need to evaluate the books in the field and disseminate the results to readers of the IEEE TRANSACTIONS ON MEDICAL IMAGING.

In this issue, we introduce a Book Review2 — first of a series that will be managed by Ge Wang, Ph.D., who recently joined the IEEE TRANSACTIONS ON MEDICAL IMAGING as Associate Editor. Dr. Wang is a frequent contributor to this transactions, and served as Guest Editor of the September 2000 issue (vol. 19, no. 9).

We invite interested individuals and organizations to recommend books for review, make suggestions, and serve as book reviewers. Publishers can submit finished copies of their books for consideration. They will be listed as received on the transaction’s website (available at: www.ieee-tmi.org). Specific guidelines have been developed for book reviews in the IEEE TRANSACTIONS ON MEDICAL IMAGING, based on the best examples we found in major peer-reviewed journals including Nature, Science, the PROCEEDINGS OF THE IEEE, and other IEEE transactions and magazines. We found significant variation in the quality, depth and length of these reviews — some are short and contain a few general comments. Others are very detailed, citing references and commenting in detail on the technical quality and suggesting research directions. Although there are neither strict rules nor a universal format for book reviews, we make the following comments that indicate the standards we will maintain. This information may be of particular interest to book publishers and potential reviewers.

A book review should summarize the content of the book in a thorough yet easy-to-read manner. The review should answer several questions. For example, what is the theme of the book? The review must define the intended audience and prerequisite background in terms of university courses or educational level. Does the book deal with theoretical or practical issues or both? Each book review should identify the reviewer and contain bibliographic information (title, authorship, publisher, place, edition, pages, date, and price).

A book review should offer a critical analysis, not merely a summary of the content. Are concepts clearly defined? How well are the ideas developed? How effectively do figures, and companion CDs if any, facilitate understanding? Is the presentation well balanced? Are there any significant bias and omissions? Although a positive tone is preferable, both the strengths and weaknesses of the work should be noted. The book reviewer may draw input from others, but the review published under his/her name is ultimately an expression of his/her opinion. If the book introduces new theory and techniques, readers expect insights about potential applications and further directions.

Although the format can be flexible, the succinct writing style is required. The length of book reviews should not exceed 2000 words. Further details are provided on the transaction’s website.

All invited or reviewer-initiated book reviews will be published in the T-MI website, http://www.ieee-tmi.org. That dedicated T-MI resource will serve as a preliminary forum for communications on book review policies, procedures and related activities. We will subject all book reviews to editorial scrutiny and may, according to the quality, originality, importance to the T-MI readership, and timeliness, publish the reviews in the transactions itself.

This initiative should provide the readership of T-MI with authoritative, up-to-date, and informative reviews of important books in the field of Medical Imaging. We appreciate the encouragement and efforts of all T-MI authors and readers, and hope that this new means of expression will satisfy an important need in our field.

II. MISSION STATEMENT AND STATUS OF THE NIH BIOIMAGING AND BIOENGINEERING INSTITUTE

The development of the new National Institute of Biomedical Imaging and Bioengineering (NIBIB) at the NIH is proceeding with the preparation of an establishment package and mission statement. The NIBIB was signed into law by President Clinton on December 29, 2000.

An establishment package consisting of a mission statement, initial budget, and organization chart has been prepared and transmitted to the Department of Health and Human Services for approval. When approval is received, the search for a director and administrative staff will begin. Information will also

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be posted on the Internet as part of the NIH Bioengineering Web site until a separate site for the NIBIB is warranted. The current “best estimate” timetable is that the search for a NIBIB Director will begin around mid-to-late April, staffing and space allocation will continue during the remainder of CY 2001, and the Institute will be functional (e.g., making grants) during early CY 2002.

The NIBIB Mission statement as of March 5, 2001, is as follows:

The mission of the National Institute of Biomedical Imaging and Bioengineering is to improve health by promoting fundamental discoveries, design and development, and translation and assessment of technological capabilities in biomedical imaging and bioengineering, enabled by relevant areas of physics, chemistry, mathematics, materials science, information science, and the computer sciences. The Institute plans, conducts, fosters, and supports an integrated and coordinated program of research and research training that can be applied to a broad spectrum of biological processes, disorders and diseases, and organ systems. The Institute coordinates with the biomedical imaging and bioengineering programs of other agencies and NIH institutes to support imaging and engineering research with potential medical applications and facilitates the transfer of such technologies to medical applications.

In support of this mission, the Institute will:

- Support research and research training through existing NIH funding mechanisms and take the lead in exploring novel approaches for funding technology development and interdisciplinary research.
- Form partnerships with NIH institutes and centers to translate fundamental discoveries into research and applications for specific diseases, disorders, or biological processes.
- Coordinate with other government agencies to translate fundamental or crosscutting discoveries in imaging and bioengineering and related areas of information science and technology assessment into biomedical applications.
- Encourage and support the development of relevant standards and guidelines that will enable widespread adaptability for biomedical imaging, bioengineering, and related information science and technology and computation by taking a leadership and coordinating role for the NIH.

III. INSTITUTE OF MEDICINE REPORT ON BREAST CANCER SCREENING

In March 2001, the Institute of Medicine (IOM) issued a report, “Mammography and Beyond—Developing Technologies for the Early Detection of Breast Cancer” that reviews the field of screening mammography and makes several recommendations to improve the diffusion of new technology into clinical applications. These recommendations will likely have far reaching implications and may influence several other cancer screening technologies that are in development now, including low dose CT scanning for lung cancer and virtual colonoscopy for colon cancer.

This IOM report encourages changes in the regulatory and reimbursement oversight of screening technologies by U.S. federal agencies, particularly the Food and Drug Administration (FDA) and Health Care Financing Administration (HCFA). Unique to mammography, the FDA regulates both the medical devices and their clinical applications under the Mammography Quality Standards Act (MQSA). The IOM committee recommended changes that would improve the process for introduction of new technologies in conjunction with ongoing clinical trials.

Among the most important trials in breast screening is a new multicenter investigation of digital versus film screening mammography for breast cancer sponsored by the American College of Radiology Imaging Network (ACRIN). This trial, which should open in the next several weeks at 20 centers across the U.S. will enroll almost 50,000 women and test digital mammography systems from four manufacturers.

The IOM report on breast cancer detection follows a survey of emerging imaging technologies by the National Cancer Institute, and an earlier report by the National Research Council on “Mathematics and Physics of Emerging Biomedical Imaging.”

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4http://www.fda.gov/cdrh/mammography/.

5http://www.acrin.org/.
