The Handbook of Medical Image Perception and Techniques, Second Edition

A state-of-the-art review of key topics in medical image perception science and practice, including associated techniques, illustrations, and examples. This second edition contains extensive updates and substantial new content. Written by key figures in the field, it covers a wide range of topics, including signal detection, image interpretation, and advanced image analysis (e.g., deep learning) techniques for interpretive and computational perception. It provides an overview of the key techniques of medical image perception and observer performance research, and includes examples and applications across clinical disciplines, including radiology, pathology, and oncology. A final chapter discusses the future prospects of medical image perception and assesses upcoming challenges and possibilities, enabling readers to identify new areas for research. Written for both newcomers to the field and experienced researchers and clinicians, this book provides a comprehensive reference for those interested in medical image perception as a means of advancing knowledge and improving human health.

EHSAN SAMEI is Professor in Radiology, Physics, Biomedical Engineering, Electrical and Computer Engineering, and Medical Physics at Duke University, Durham, NC, where he is Chief of the Clinical Imaging Physics and Director of the Medical Physics Graduate Program. His current research includes quality and dose metrics that are clinically relevant and that can be used to design and utilize advanced imaging technologies for optimum interpretive and quantitative performance.

ELIZABETH A. KRUPINSKI is Professor and Vice Chair for Research at Emory University, Atlanta, GA in the Departments of Radiology, Psychology, and Biomedical Informatics. Her research interests include medical image perception, assessment of observer performance, and human factors.

"In *The Handbook of Medical Image Perception and Techniques*, Samei and Krupinski have assembled a group of internationally-recognized experts to address an important but under-emphasized stage in the process of medical imaging."

William Hendee, Distinguished Professor Emeritus,
Medical College of Wisconsin

"A concise text that offers a unique collection of chapters from all the leading authors in medical perception. I would highly recommend this text for anyone wanting to know more about medical perception from its historical perspective to current research. A must have reference for anyone wanting to join in this exciting discipline."

Lonie R. Salkowski, Professor of Radiology,
University of Wisconsin Madison

"Drs. Elizabeth Krupinski and Ehsan Samei have given us a wonderful new edition of their landmark textbook on Medical Image Perception, with updated chapters throughout and with approximately 30% new material added since the first edition was published in 2010. This new volume comprehensively updates and extends the 'keystone' publication in the field of medical image perception research. Each chapter is the definitive reference on its topic, authored by a foremost expert. With this new edition, Drs. Krupinski and Samei have assembled a compendium of what amounts to decades of research and accumulated wisdom in a compact package – comprehensive and yet still very accessible for a broad audience. Topics include a basic theoretical framework for medical imaging perception, an historical overview of the field, an authoritative and detailed summary of the science of medical imaging perception, and a look forward to how advanced computational and AI methods will impact diagnostic radiology in the foreseeable future. Anyone with an interest in this topic will find this book to be an invaluable resource."

Michael A. Bruno, Professor of Radiology and Medicine,
Pennsylvania State University

THE HANDBOOK OF MEDICAL IMAGE PERCEPTION AND TECHNIQUES

Second Edition

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Dedicated to Maija Bell Samei,
whose love, understanding, and encouragement have been my perpetual companions,
and to my beautiful children, Mani, Mateen, Mitra, and Maryam, who have inspired and
motivated me along every step of the path, whether straight or winding.
E.S.

Dedicated to my parents Carole and Joseph Krupinski,
who instilled in me the appreciation of lifelong learning and hard work, to my medical image
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my husband Michel Rogulski, PhD, who supports and stands by me every day.
E.A.K.

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