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Diabetic retinopathy

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Photo Acoustic and Optical Coherence Tomography Imaging, Volume 1

Diabetic retinopathy

Edited by
Ayman El-Baz
University of Louisville, Louisville, KY, USA

Jasjit S Suri
AtheroPoint LLC, Roseville, CA, USA

IOP Publishing, Bristol, UK

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With love and affection to my mother and father, whose loving spirit sustains me still.

—Ayman El-Baz

To my late loving parents, immediate family, and children.

—Jasjit S Suri

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Preface

This book covers the state-of-the-art techniques of optical coherence tomography (OCT) imaging for the diagnosis of retinal diseases. Clinical disorders of the retina have been attracting the attention of researchers, aiming at reducing the blindness rate. This includes uveitis, diabetic retinopathy, macular edema, endophthalmitis, proliferative retinopathy, age-related macular degeneration and glaucoma. Currently, most ophthalmologists perform diagnosis by visual observation and interpretation. Treatment is significantly dependent on having an early and accurate diagnosis, which can be significantly improved by employing disease-specific computer-aided diagnostic (CAD) systems based on different image modalities such as: OCT, fundus imaging, and optical coherence tomography angiography (OCTA). This book will focus on OCT imaging for the diagnosis of retinal diseases. Among the topics discussed in the book are computerized tools for the automatic segmentation of diffuse retinal thickening edemas using OCT scans; recent developments in OCTA imaging for the diagnosis and assessment of diabetic retinopathy; multimodal photoacoustic microscopy; identification and measurement of abnormal retinal fluid; comparison of ocular ultrasound with OCT in the evaluation of diabetic retinopathy; OCT biomarkers in diabetic macular edema; deep learning-based multi-class retinal fluid segmentation and detection in OCT images; OCT and OCTA for the diagnosis and treatment of diabetic macular edema; eye sicknesses diagnosis using OCT and fundus imaging techniques; and early identification of diabetic retinopathy through a higher-order spatial 3D-OCT appearance model CAD system.

In summary, the main aim of this book is to help advance scientific research within the broad field of OCT imaging for the diagnosis of retinal diseases. The book focuses on major trends and challenges in this area, and it presents work aimed to identify new techniques and their use in biomedical analysis.

Ayman El-Baz
Jasjit S Suri

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Ayman El-Baz
Jasjit S Suri

Editor biographies

Ayman El-Baz

Ayman El-Baz is a Distinguished Professor at University of Louisville, Kentucky, United States and University of Louisville at Alamein International University (UofL-AIU), New Alamein City, Egypt. Dr El-Baz earned his BSc and MSc degrees in electrical engineering in 1997 and 2001, respectively. He earned his PhD in electrical engineering from the University of Louisville in 2006. Dr El-Baz was named as a Fellow for IEEE, Coulter, AIMBE and NAI for his contributions to the field of biomedical translational research. Dr El-Baz has almost two decades of hands-on experience in the fields of bio-imaging modeling and non-invasive computer-assisted diagnosis systems. He has authored or coauthored more than 700 technical articles.

Jasjit S Suri

Jasjit S Suri is an innovator, scientist, visionary, industrialist and an internationally known world leader in biomedical engineering. Dr Suri has spent over 25 years in the field of biomedical engineering/devices and its management. He received his PhD from the University of Washington, Seattle and his Business Management Sciences degree from Weatherhead, Case Western Reserve University, Cleveland, Ohio. Dr Suri was crowned with the President's Gold medal in 1980 and made Fellow of the American Institute of Medical and Biological Engineering for his outstanding contributions. In 2018, he was awarded the Marquis Life Time Achievement Award for his outstanding contributions and dedication to medical imaging and its management

List of contributors

Waleed H Abdulla
Department of Electrical, Computer, and Software Engineering, The University of Auckland, New Zealand

Josh Agranat
Boston Medical Center/Boston University School of Medicine, Boston, MA, USA

Marah Alhalabi
Electrical and Computer Engineering Department, Abu Dhabi University, UAE

Nurettin Bayram
Etlik City Training
and
Research Hospital, Department of Ophthalmology, University of Health Sciences, Ankara, Turkey

Pablo Carnota-Méndez
Centro de Ojos de La Coruña, La Coruña, Spain

Renoh Johnson Chalakkal
oDocs Eye Care Ltd, New Zealand
and
Department of Electrical, Computer, and Software Engineering, The University of Auckland, New Zealand

José Cunha-Vaz
AIBILI, Coimbra, Portugal and University of Coimbra, Coimbra, Portugal

Vani Damodaran
Department of Biomedical Engineering, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India

Joaquim de Moura
Department of Computer Science and Information Technology, CITIC, University of A Coruña, Spain

Ahmed El-Baz
duPont Manual, Louisville, KY, USA
and
Bioimaging Laboratory, Department of Bioengineering, University of Louisville, Louisville, KY, USA

Ayman El-Baz
Bioimaging Laboratory, Department of Bioengineering, University of Louisville, Louisville, KY, USA

Mohamed Elsharkawy
Bioimaging Laboratory, Department of Bioengineering, University of Louisville, Louisville, KY, USA

Mohammed Ghazal
Electrical and Computer Engineering Department, Abu Dhabi University, UAE

María Gil-Martínez
Complejo Hospitalario Universitario de Santiago de Compostela (Spain). Instituto Oftalmológico Gómez-Ulla, Santiago de Compostela, Spain

Guruprasad Giridharan
Bioimaging Laboratory, Department of Bioengineering, University of Louisville, Louisville, KY, USA

Eugene Hsu
Boston University School of Medicine, Boston, MA, USA

Pauline John
Laboratory for Advanced Bio-Photonics and Imaging, Division of Engineering, New York University Abu Dhabi, Abu Dhabi, UAE

Fahmi Khalifa
Department of Electrical and Computer Engineering, Morgan State University, Baltimore, MD, USA

Prakash Kumar Karn
Department of Electrical, Computer, and Software Engineering, The University of Auckland, New Zealand

Conceição Lobo
AIBILI, Coimbra, Portugal
and
University of Coimbra, Coimbra, Portugal

Ali Mahmoud
Bioimaging Laboratory, Department of Bioengineering, University of Louisville, Louisville, KY, USA

João Heitor Marques
Institute for the Biomedical Sciences Abel Salazar - University of Porto, Centro Hospitalar Universitário de Santo António, Porto, Portugal

Carlos Méndez-Vázquez
Centro de Ojos de La Coruña, La Coruña, Spain

Sandra R Montezuma
University of Minnesota, Munneapolis, MN, USA

Hossein Nazari
University of Minnesota, Munneapolis, MN, USA

Van Phuc Nguyen
Department of Ophthalmology and Visual Sciences, University of Michigan, Ann Arbor, MI 48105, USA

Jorge Novo
Department of Computer Science and Information Technology, CITIC, University of A Coruña, Spain

Nuria Olivier-Pascual
Complejo Hospitalario Universitario de Ferro, Spain

Marcos Ortega
Department of Computer Science and Information Technology, CITIC, University of A Coruña, Spain

Pawarissara Osathanugrah
Boston Medical Center/Boston University School of Medicine, Boston, MA, USA

Yannis Paulus
Department of Ophthalmology and Visual Sciences, University of Michigan, Ann Arbor, MI 48105, USA

Bernardete Pessoa
Unit for Multidisciplinary Research in Biomedicine - Institute for the Biomedical Sciences Abel Salazar - University of Porto, Centro Hospitalar Universitário de Santo António, Porto, Portugal

Amber Piazza
University of Minnesota Medical School, Minneapolis, MN, USA

Sara Rubio-Cid
Complejo Hospitalario Universitario de Ferrol, Spain

Harpal Sandhu
Bioimaging Laboratory, Department of Bioengineering, University of Louisville, Louisville, KY, USA

Nayan Sanjiv
Boston Medical Center/Boston University School of Medicine, Boston, MA, USA

Torcato Santos
AIBILI, Coimbra, Portugal

Ahmed Sharafeldeen
Bioimaging Laboratory, Department of Bioengineering, University of Louisville, Louisville, KY, USA

Ahmed Soliman
Bioimaging Laboratory, Department of Bioengineering, University of Louisville, Louisville, KY, USA

Manju Subramanian
Boston Medical Center/Boston University School of Medicine, Boston, MA, USA

N Sujatha
Biophotonics Laboratory, Department of Applied Mechanics, Indian Institute of Technology, Madras, India

Meysam Tavakoli
Department of Radiation Oncology and Winship Cancer Institute, Emory University, Atlanta, Georgia, USA

Aristomenis Thanos
Legacy Devers Eye Institute, Portland, OR, USA

Carlos Torres-Borrego
Centro de Ojos de La Coruña, La Coruña, Spain

Nilesh J Vasa
Opto-mechatronics Laboratory, Department of Engineering Design, Indian Institute of Technology, Madras, India

Daniel Velázquez-Villoria
Hospital POVISA, Vigo (Spain). Clínica Villoria, Vigo, Spain

Plácido L Vidal
Department of Computer Science and Information Technology, CITIC, University of A Coruña, Spain

Xueding Wang
Department of Biomedical Engineering, University of Michigan, Ann Arbor, MI 48105, USA

Wei Zhang
Department of Biomedical Engineering, University of Michigan, Ann Arbor, MI 48105, USA