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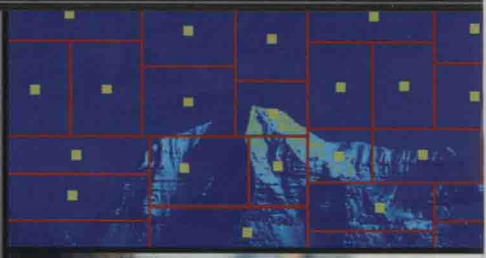

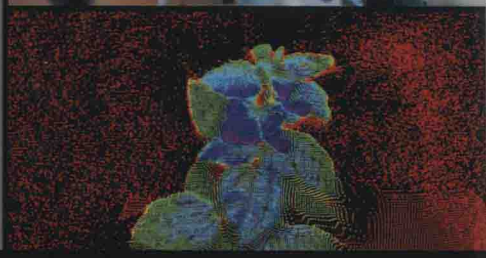

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New Technologies and Applications

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Preface

Optical Imaging Devices: New Technologies and Applications provides an essential understanding of the design, operation, and practical applications of optical imaging and sensing systems, making it a handy reference for students and practitioners alike.

This book delivers a comprehensive introduction to optical imaging and sensing, from devices to system-level applications. Drawing upon the extensive academic and industrial experience of its prestigious editors and renowned chapter authors, this authoritative text explains the physical principles of optical imaging and sensing, providing an essential understanding of the design, operation, and practical applications of optical imaging and sensing systems.

It covers multidisciplinary topics such as fluorescence imaging system for freely moving animals, eye-in-hand robotics, smart eye tracking sensors, silicon-based imaging characteristics, nanophotonic phased arrays, thin-film sensors, label-free DNA sensors, and in vivo flow cytometry.

We would like to thank all the authors for their contributions to this book. Finally, we would like to thank the staff of CRC, especially Nora Konopka, for their kind help in publishing this book.

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Editors

Dr. Ajit Khosla is a professor at the Soft & Wet Matter Engineering Lab (SWEL), Graduate School of Science and Engineering, Yamagata University, Japan, and a visiting professor at the MEMS Research Lab, Department of Mechanical Engineering, College of Engineering, San Diego State University, California, USA. His research work in the area of nano-microsystems has resulted in over ninety-five scientific and academic contributions. These contributions include: four keynote lectures, four patents, twenty journal papers, eight invited papers, two technical magazine articles, forty-five conference papers, twelve invited talks and one book chapter. His work has been referenced and downloaded over 1000 times since 2008. Dr. Khosla received a PhD from Simon Fraser University, Burnaby, British Columbia, Canada, where he was awarded the 2012 Dean of Graduate Studies Convocation Medal for his PhD research work on the development of novel micropatternable multifunctional nanocomposite materials for flexible nano- and microsystems. He then served as a postdoctoral fellow at Concordia University, Montreal, Québec, Canada, and at the University of Calgary, Alberta, Canada. In 2014, he founded and established a successful nano-microsystem company called Lab177 Inc. in Chatham, Ontario, Canada, which focuses on nano-microsystems in healthcare and flexible electronics. An active member in the scientific community, he is an Executive and Program Committee member for two major conferences, including Treasurer for the Electrochemical Society (ECS): Sensor Division, and the Society of Photographic Instrumentation Engineers (SPIE): Smart Structures and Materials-NDE. He has organized various Institute of Electrical and Electronics (IEEE) technical meetings and has been lead organizer for two major conference tracks at ECS, and also a guest editor for a focus issue on: (1) Microfluidics, MEMS/NEMS Sensors and Devices; (2) Nano-Microsystems in Healthcare and Environmental monitoring. He has served on the editorial board of the *Journal of Microelectronics Engineering* (Elsevier) since May 12th, 2013. Furthermore, he is also Editor for the yearly Special Issue with *Journal of Microsystem Technologies* (Springer) on Smart Systems.

Dongsoo Kim received his MS and PhD degrees in electrical and electronics engineering from Yonsei University, Seoul, Korea. Currently, Dr. Kim works as a principal engineer in the Wireless Communication Division at Samsung Electronics, Suwon, Korea. Previously, he was a staff analog design engineer at Aptina Imaging, San Jose, California, USA, and a postdoctoral associate in the Department of Electrical Engineering at Yale University, New Haven, Connecticut, USA. His research interests include CMOS image sensors, smart sensors, low-noise circuit design, and biomedical instrumentation.

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