Digital Holographic Microscopy Principles Techniques And Applications Springer Series In Optical Sciences

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Advancement of Optical Methods & Digital Image Correlation in Experimental Mechanics, Volume 3 Praise for the First Edition “essential reading for any physical scientist who is interested in performing biological research.” —Contemporary Physics “an ambitious text. Each chapter contains protocols and the conceptual reasoning behind them, which is often useful to physicists performing biological experiments for the first time.” —Physics Today This fully updated and expanded text is the best starting point for any student or researcher in the physical sciences to gain firm grounding in the techniques employed in molecular biophysics and quantitative biology. It includes brand new chapters on gene expression techniques, advanced techniques in biological light microscopy (super-resolution, two-photon, and fluorescence lifetime imaging), holography, and gold nanoparticles used in medicine. The author shares invaluable practical tips and insider’s knowledge to simplify potentially confusing techniques. The reader is guided through easy-to-follow examples carried out from start to finish with practical tips and insider’s knowledge. The emphasis is on building comfort with getting hands with basic methods and finally understanding when and how to apply or adapt them to different situations. Jay L. Nadeau is a scientific researcher and head of the Biomedical Engineering in Advanced Applications of Quantum, Oscillatory, and Nanotechnological Systems (BEAAQONS) lab at Caltech and was previously associate professor of biomedical engineering and physics at McGill University.

Understanding Biophotonics This book is unique in covering most of developments on optical holography starting from photorefractive recording techniques to CMOS based digital holography. It also covers fundamentals and applications of dynamic holography using photorefractive crystals and many different types of digital holography and its many applications. The author examines and discusses i) Basic principles and applications of Real-Time holography using photorefractive crystals, ii) Principles of Computer generated holography and its applications iii) Photopolymer based display holography iv) Principles and techniques of digital holography v) Dynamic and Geometric phase shifting digital holography techniques vi) Principles and applications of Conoscope holography vii) Principles of Stokes/Correlation holography. This book will include in addition to 7 topics listed in the previous paragraph, some of the important applications of each topic like digital holographic microscopy, Real-Time/Time Average/ Double exposure digital holographic interferometry, digital holographic photoelasticity for stress or strain measurements etc. This book is intended for advanced undergraduate/ and first year graduate level students as well as researchers looking for a complete resource in Holography an includes homework problems and a solutions manual for adopting professors.

A Practical Guide to Optical Microscopy Get up to speed with digital holography with this concise and straightforward introduction to modern techniques and conventions. Building up from the basic principles of optics, this book describes key techniques in digital holography, such as phase-shifting holography, low-coherence holography, diffraction tomographic holography and optical scanning holography, discussing their practical applications, and accompanied by all the theory necessary to understand the underlying principles at work. A further chapter covers advanced techniques for producing computer-generated holograms. Extensive Matlab code is integrated with the text throughout and available for download online, illustrating both theoretical results and practical considerations such as aliasing, zero padding and sampling. Accompanied by end-of-chapter problems and an online solutions manual for instructors, this is an indispensable resource for students, researchers and engineers in the fields of optical image processing and digital holography.

Digital Holographic Microscopy Where conventional testing and inspection techniques fail at the micro-scale, optical techniques provide a fast, robust, and relatively inexpensive alternative for investigating the properties and quality of microsystems. Speed, reliability, and cost are critical factors in the continued scale-up of microsystems technology across many industries, and optical techniques are in a unique position to satisfy modern commercial and industrial demands. Optical Inspection of Microsystems is the first comprehensive, up-to-date survey of the most important and widely used full-field optical metrology and inspection technologies. Under the guidance of accomplished researcher Wolfgang Osten, expert contributors from industrial and academic institutions around the world share their expertise and experience with techniques such as image correlation, light scattering, scanning probe microscopy, confocal microscopy, fringe projection, grid and moiré techniques, interference microscopy, laser Doppler vibrometry, holography, computer-aided metrology, and spectroscopy. They also examine modern approaches to data acquisition and processing. The book emphasizes the evaluation of various properties to increase reliability and promote a consistent approach to optical testing. Numerous practical examples and illustrations reinforce the concepts. Supplied advanced tools for microsystem manufacturing and characterization, Optical Inspection of Microsystems enables you to reach toward a higher level of quality and reliability in modern micro-scale applications.

Holography Holography - Basic Principles and Contemporary Applications is a collection of fifteen chapters, describing the basic principles of holography and some recent innovative developments in the field. The book is divided into three sections. The first, Understanding Holography, presents the principles of hologram recording illustrated with practical examples. A comprehensive review of diffraction in volume gratings and holograms is also presented. The second section, Contemporary Holographic Applications, is concerned with advanced applications of holography including sensors, holographic gratings, white-light viewable holographic stereograms. The third section of the book Digital Holography is devoted to digital hologram coding and digital holographic microscopy.

Optical Metrology with Interferometry

Springer Series in Light Scattering This highly practical and self-contained guidebook explains the principles and major applications of digital hologram recording and numerical reconstruction (Digital Holography). A special chapter is dedicated to digital holographic interferometry with applications in deformation and shape measurement and refractive index determination. Applications in imaging and microscopy are also described. Special techniques such as digital light-in-flight holography, holographic endoscopy, information encrypting, comparative holography, and related techniques of speckle metrology are also treated.
Optical Microscopic and Spectroscopic Techniques Targeting Biological Applications This book presents not only the simultaneous combination of optical methods based on holographic principles for marker-free imaging, real-time trapping, identification and tracking of micro objects, but also the application of substantially low coherent light sources and non-diffractive beams. It first provides an overview of digital holographic microscopy (DHM) and holographic optical tweezers as well as non-diffracting beam types for minimal-invasive, real-time and marker-free imaging as well as manipulation of micro and nano objects. It then investigates the design concepts for the optical layout of holographic optical tweezers (HOTs) and their optimization using optical simulations and experimental methods. In a further part, the book characterizes the corresponding system modules that allow the addition of HOTs to commercial microscopes with regard to stability and diffraction efficiency. Further, based on experiments and microfluidic applications, it demonstrates the functionality of the combined setup, and discusses several types of non-diffracting beams and their application in optical manipulation. The book shows that holographic optical tweezers, including several non-diffracting beam types like Mathieu beams, combined parabolic and Airy beams, not only open up the possibility of generating efficient multiple dynamic traps for micro and nano particles with forces in the pico and nano newton range, but also the opportunity to exert optical torque with special beams like Bessel beams, which can facilitate the movement and rotation of objects by generating microfluidic flows. The last part discusses the potential use of a slightly modified DHM-HOT-system to explore the functionality of direct laser writing based on a two photon absorption process in a negative photoresist with a continuous wave laser.

Holoscopy The volume set LNAI 11740 until LNAI 11745 constitutes the proceedings of the 12th International Conference on Intelligent Robotics and Applications, ICIRA 2019, held in Shenyang, China, in August 2019. The total of 378 full and 25 short papers presented in these proceedings was carefully reviewed and selected from 522 submissions. The papers are organized in topical sections as follows: Part I: collective and social robots; human biomechanics and human-centered robotics; robotics for cell manipulation and characterization; field robots; compliant mechanisms; robotic grasping and manipulation with incomplete information and strong disturbance; human-centered robotics; development of high-performance joint drive for robots; modular robots and other mechatronic systems; compliant manipulation learning and control for robotic manipulators. Part II: power-assisted system and control; bio-inspired wall climbing robot; underwater acoustic and optical signal processing for environmental cognition; piezoelectric actuators and micro-nano manipulations; robot vision and scene understanding; visual and motion learning in robotics; signal processing and underwater bionic robots; soft locomotion robot; teleoperation robot; autonomous control of unmanned aircraft systems. Part III: marine bio-inspired robotics and soft robotics; materials, mechanisms, modelling, and control; robot intelligence technologies and system integration; continuum mechanisms and robots; unmanned underwater vehicles, intelligent robots for environment detection or fine manipulation; parallel robotics; human-robot collaboration; swarm intelligence and multi-robot cooperation; adaptive and learning control system; wearable and assistive devices and robots for healthcare; nonlinear systems and control. Part IV: swarm intelligence unmanned system; computational intelligence inspired robot navigation and SLAM; fuzzy modelling for automation, control, and robotics; development of ultra-thin-film, flexible sensors, and tactile sensation; robotic technology for deep space exploration; wearable sensing based limb motor function rehabilitation; pattern recognition and machine learning; navigation/localization. Part V: robot legged locomotion; advanced measurement and machine vision system; man-machine interactions; fault detection, testing and diagnosis; estimation and identification; mobile robots and intelligent autonomous systems; robotic vision, recognition and reconstruction; robot mechanism and design. Part VI: robot motion analysis and planning; robot design, development and control; medical robot; robot intelligence, learning and linguistics; motion control; computer integrated manufacturing; robot cooperation; virtual and augmented reality; education in mechatronics engineering; robotic drilling and sampling technology; automotive systems; mechatronics in energy systems; human-robot interaction.

Digital Holography and Wavefront Sensing Provides a broad overview of advanced multidimensional imaging systems with contributions from leading researchers in the field. Multi-dimensional imaging takes the reader through the introductory concepts through to the latest applications of these techniques. Split into 3 parts covering 3D image capture, processing, visualization and display, it 1) a Multi-View Approach and 2) a Holographic Approach, followed by a 3rd part addressing other 3D systems approaches, applications and signal processing for advanced 3D imaging. This book describes recent developments, as well as the prospects and challenges in advances in imaging sciences and engineering such as 3D image sensing, 3D holographic imaging, imaging applications for bio-photonics and 3D image recognition. Advanced imaging systems incorporate knowledge from various fields. It is a complex technology that combines physics, optics, signal processing, and image capture techniques. Provides a broad overview of advanced multidimensional imaging systems with contributions from leading researchers in the field. Integrates the background, introductory material with new advances in 3D imaging and applications. Contains the most recent technologies such as high speed digital holography, compressive sensing, real-time 3D imaging, 3D TV, photon counting imaging. To be available as an enhanced ebook with added information and content. Colour films showing the effects of advanced 3D applications such as 3D microscopy, 3D biomedical imaging and 3D for security and defense applications. As a single source reference to the rapidly developing field of 3D imaging technology. Provides supplementary material on a companion website including video clips, examples, numerical simulations, and experimental results to show the theoretical concepts. Provides contributions from leading researchers from across these fields, Multi-dimensional Imaging is a comprehensive reference for the imaging technology research community.

Digital Holography and Wavefront Sensing Advancement of Optical Methods & Digital Image Correlation in Experimental Mechanics, Volume 3 of the Proceedings of the 2018 SEM Annual Conference & Exposition on Experimental and Applied Mechanics, the third volume of eight from the Conference, brings together contributions to this important area of research and engineering. The collection presents early findings and case studies on a wide range of optical methods ranging from traditional photoelasticity and interferometry to more recent DIC and DVC techniques, and includes papers in the following general technical research areas: New Techniques in Optical Methods; Fringe Pattern Analysis; DIC Applications for Challenging Environments; Optical Methods in SEM: History & Perspective; Mechanical Characterization of Materials & Structures with Optical Methods; Bioengineering.

Micro- and Nanophotonic Technologies Edited and authored by leading experts from top institutions in Europe, the US and Asia, this comprehensive overview of micro- and nanophotonics covers the physical and chemical fundamentals, while clearly focusing on the technologies and applications in industrial R&D. As such, the book region in the four main areas of telecommunications and display technologies; light conversion and energy generation; light-based fabrication of materials; and micro- and nanophotonic devices in medicine and control.

Cell Volume Regulation This book deals with the latest achievements in the field of optical coherent microscopy. While many other books exist on microscopy and imaging, this book provides a unique resource dedicated to one specific subject. Similar to past titles, this book describes optical microscopy and microscopy reference provided here does not focus on the experimental mechanics of such techniques but instead is meant to provide a users manual to illustrate the strengths and capabilities of developing techniques. The areas of application of this technique are in biomedicine, medicine, life sciences, nanotechnology and materials sciences.

Encyclopedia of Biomedical Engineering Digital holography is an emerging field of new paradigm in general imaging applications. The book presents an introduction to the theoretical and numerical principles and reviews the research and development activities in digital holography, with emphasis on the microscopy techniques and applications. Topics covered include the general theory of diffraction and holography formations, and practical instrumentation and experimentation of digital holography. Various numerical techniques are described that give rise to the unique and versatile capabilities of digital holography. Representative special techniques and applications of digital holography are discussed. The book is intended for researchers interested in developing new techniques and exploring new applications of digital holography.
differential interference contrast (DIC) microscopy, phase contrast microscopy, digital holographic microscopy, optical coherence tomography, tomographic phase microscopy, spectral-domain phase detection, and nanoparticle usage for phase nanoscopy The Editors show biomedical and optical engineers how to use phase microscopy for visualizing unstained specimens, and support the theoretical coverage with applied content and examples on designing systems and interpreting results in bio- and nanoscience applications. Provides a comprehensive overview of the principles and techniques of optical phase microscopy and nanoscopy with biomedical applications. Tips/advice on building systems and working with advanced imaging biomedical techniques, including interpretation of phase images, and techniques for quantitative analysis based on phase microscopy. Interdisciplinary approach that combines optical engineering, nanotechnology, biology and medical aspects of this topic. Each chapter includes practical implementations and worked examples.

Holography, 3D Imaging and 3D Display This book is dedicated to label-free, non-invasive monitoring of cell-based assays and it comprises the most widely applied techniques. Each approach is described and critically evaluated by an expert in the field such that researchers get an overview on what is possible and where the limitations are. The book provides the theoretical basis for each technique as well as the most successful and exciting applications. Label-free bioanalytical techniques have been known for a long time as valuable tools to monitor adsorption processes at the solid-liquid interface in general – and biomolecular interaction analysis (BIA) in particular. The underlying concepts have been progressively transferred to the analysis of cell-based assays. The strength of these approaches is implicitly given with the name ‘label-free’: the readout is independent of any label, reagent or additive that contaminates the system under study and potentially affects its properties. Thus, label-free techniques provide an unbiased analytical perspective in the sense that the sample is not manipulated by additives but pure. They are commonly based on physical principles and read changes in integral physical properties of the sample like refractive index, conductivity, capacitance or elastic modulus to mention just a few. Even though it is not implied in the name, label-free approaches usually monitor the cells under study non-invasively meaning that the amplitude of the signal (e.g. electric field strength, mechanical elongation) that is used for the measurement is too low to interfere or affect. In contrast to label-based analytical techniques that are commonly restricted to a single reading at a predefined time point, label-free approaches allow for a continuous observation so that the dynamics of the biological system or reaction become accessible.

Biomaterials Science Progress in Optomechatronics Biophotonics involves understanding how light interacts with biological matter, from molecules and cells, to tissues and even whole organisms. Light can be used to probe biomolecular events, such as gene expression and protein–protein interaction, with impressively high sensitivity and specificity. The spatial and temporal distribution of biochemical constituents can also be visualized with light and, thus, the corresponding physiological dynamics in living cells, tissues, and organisms in real time. Light can also be used to alter the properties and behaviors of biological matter, such as to damage cancerous cells by laser surgery or therapy, and manipulate the neuronal signaling in a brain network. Fueled by the innovations in photonic technologies in the past half century, biophotonics continues to play a ubiquitous role in revolutionizing basic life science studies as well as biomedical diagnostics and therapies. Advancements in biophotonics in the past few decades can be seen not only in biochemistry and cell/molecular biology, but also in numerous preclinical applications. Researchers around the world are searching for ways to bring biophotonic technologies into real clinical practices, particularly cellular and molecular optical imaging. Meanwhile, emerging technologies such as laser nanosurgery and nanoplasmonics, have created new insights for understanding, monitoring, and even curing diseases on a molecular basis. This book presents the essential basics of optics and biophotonics to newcomers (senior undergraduates or postgraduate researchers) who are interested in this multidisciplinary research field. With stellar contributions from leading experts, the book highlights the major advancements in preclinical diagnostics using optical microscopy and spectroscopy, including multiphoton microscopy, super-resolution microscopy, and endoscopy. It also introduces a number of emerging techniques and tools for biophotonics applications, such as nanoplasmonics, microresonators for molecular detection, and subcellular optical nanosurgery.

Handbook of Optical Metrology Modern holographic techniques have been successfully applied in many important areas, such as 3-D inspection, 3-D microscopy, metrology, and profilometry, augmented reality, and industrial informatics. This Special Issue covers selected pieces of cutting-edge research works, ranging from low-level acquisition, to high-level analysis, processing, and manipulation of holographic information. The Special Issue also serves as a comprehensive review of existing state-of-the-art techniques in 3-D imaging and 3-D display, as well as broad insights into the future development of these disciplines. The Special Issue contains 25 papers in the field of holography, 3-D imaging, and 3-D display. All the papers underwent substantial peer review under the guidelines of Applied Sciences.

Digitale Holographie in der Werkzeugmaschine Holoscopy is a new tomographic imaging modality that combines techniques of digital holography with Fourier-domain optical coherence tomography (FD-OCT). Dierck Hillmann gives a theoretical introduction to the mathematics and physics of holoscopy and develops an efficient numerical reconstruction procedure. Compared to FD-OCT, holoscopy provides unique advantages by enabling tomographic imaging without a limited depth of focus, but results in an increased numerical cost for reconstruction. In further chapters, the author introduces techniques for FD-OCT that are relevant to holoscopy as well. He demonstrates and compares numerical reconstruction methods for FD-OCT and shows how motion and dispersion artifacts in FD-OCT can be numerically compensated.

Holographic Materials and Optical Systems This highly practical and self-contained guidebook explains the principles and major applications of digital hologram recording and numerical reconstruction (Digital Holography). A special chapter is designated to digital holographic interferometry with applications in deformation and shape measurement and refractive index determination. Applications in imaging and microscopy are also described. Special techniques such as digital light-in-flight holography, holographic endoscopy, information encrypting, comparative holography, and related techniques of speckle metrology are also treated.

Biomedical Optical Phase Microscopy and Nanoscopy The revised edition of this renowned and bestselling title is the most comprehensive single text on all aspects of biomaterials science. It provides a balanced, insightful approach to both the learning of the science and technology of biomaterials and acts as the key reference for practitioners who are involved in the applications of materials in medicine. Over 29,000 copies sold, this is the most comprehensive coverage of principles and applications of all classes of biomaterials: “the only such text that currently covers this area comprehensively” - Materials Today Edited by four of the best-known figures in the biomaterials field today: fully endorsed and supported by the Society for Biomaterials Fully revised and expanded, key new topics include of tissue engineering, drug delivery systems, and new clinical applications, with new teaching and learning material throughout, case studies and a downloadable image bank.

Contemporary Holography Encyclopedia of Biomedical Engineering is a unique source for rapidly evolving updates on topics that are at the interface of the biological sciences and engineering. Biomaterials, biomedical devices and techniques play a significant role in improving the quality of health care in the developed world. The book covers an extensive range of topics related to biomedical engineering, including biomaterials, sensors, medical devices, imaging modalities and imaging processing. In addition, applications of biomedical engineering, advances in cardiology, drug delivery, gene therapy, orthopedics, ophthalmology, sensing and tissue engineering are explored. This important reference work serves many groups working at the interface of the biological sciences and engineering, including engineering students, scientific researchers, clinicians, and industrial researchers. Provides students with a concise description of the technologies at the interface of the biological sciences and engineering Covers all aspects of biomedical engineering, also incorporating perspectives from experts working within the domains of biomedicine, medical engineering, biology, chemistry, physics, electrical engineering, and more.
Digital Holography

This book presents the advances in super-resolution microscopy in physics and biomedical optics for nanoscale imaging. In the last decade, super-resolved fluorescence imaging has opened new horizons in improving the resolution of optical microscopes far beyond the classical diffraction limit, leading to the Nobel Prize in Chemistry in 2014. This book represents the first comprehensive review of a different type of super-resolved microscopy, which does not rely on using fluorescent markers. Such label-free super-resolution microscopy enables potentially even broader applications in life sciences and nanoscale imaging, but is much more challenging and it is based on different physical concepts and approaches. A unique feature of this book is that it combines insights into mechanisms of label-free super-resolution with a vast range of applications from fast imaging of living cells to inorganic nanostructures. This book can be used by researchers in biological and medical physics. Due to its logically organizational structure, it can be also used as a teaching tool in graduate and upper-division undergraduate-level courses devoted to super-resolved microscopy, nanoscale imaging, microscopy instrumentation, and biomedical imaging.

Introduction to Experimental Biophysics

This book proposes for the “instrumentation & measurement” collection of ISTE-Wiley is devoted to special techniques in digital holography. The co-authors aim at establishing a synthetic stat-of-the-art of important advances in the field of digital holography. We are interested in detailing advances related to fundamentals of digital holography, in-line holography applied to fluid mechanics, digital color holography, digital holographic microscopy, infrared holography, special techniques in full field vibrometry and inverse problems in digital holography. This book presents advanced techniques in the field of digital holography. The book is organized in 8 chapters. The first chapter introduces the basic fundamentals of digital holography. Chapter 2 discusses about the use of in-line holography to the study of seeded flows; the recent developments permit to apply this technique in many industrial or laboratory situations for velocimetry, particle size measurement or trajectory. Chapter 3 presents the new perspectives in 3-color holography applied to solid mechanics and fluid mechanics. Especially, a comparison between Michelson interferometer and interferometer using Wollaston prisms will be discussed. Chapter 4 is devoted to special techniques in holographic microscopy, with use of partial spatially coherent light sources; the use of a reduced coherence source is of interest for reducing the measurement noise; typical applications are detailed. Chapter 5 is devoted to applications of holographic microscopy in neurosciences. Chapter 6 presents digital holography in the infrared domain. Technology related to sensors and light sources are presented and digital holography infrared interferometry is detailed and applied to high amplitude displacements of industrial aeronic structures. Examples in NDT (non destructive testing) are also provided. Chapter 7 of the book, aims at presenting new techniques in the field of vibration measurement; especially, techniques based on high speed and ultimate sensitivity are described. Examples related to life sciences are discussed. Chapter 8 discusses about inverse problems in digital holography and demonstrates how a priori knowledge can be used to recover full information of the object scene even when recording is sparse.

New Techniques in Digital Holography

The various techniques and applications of holography are covered in this profound book. It is an elucidative account on the fundamental principles of holography and current innovative advancement in this area. Topics covered in the book include a discussion on the standards of hologram recording, an extensive review of diffraction in volume gratings and holograms, advanced functions of holography in sensors, holographic gratings and white-light viewable holographic stereograms, digital hologram coding and digital holographic coding and digital holographic microscopy.

Digital Holography

Digital holography and its application to 3-D display is one of the formidable problems of evolving areas of high technology to receive great attention in recent years. This book offers a collection of key chapters that covers digital holography and 3-D display techniques to provide the state-of-the-art developments in these important areas. The book contains research material as well as reviews, new ideas and fresh insights.

Principles of Engineering Physics

1 The accurate measurements of surface topography are becoming important to many applications in both engineering and science. Optical interferometry is considered a preferable technique for featuring accurate 3D surface profiling since it is non-contacting, non-destructive and highly accurate. In combination with computers and other electronic devices, optical interferometry has become faster, more reliable, more convenient and more robust. There is now a wealth of new optical interferometry techniques on the market, or being developed in academia, that can measure surface topography with high precision. Each method has both its strong points and its limitations. This book explains in detail the basics of optical interferometry, their common language, generic features and limitations, and their simulation and uncertainties. Moreover, it provides an introduction to new frontiers in optical interferometry, including terahertz technology and optical frequency combs.

Label-Free Monitoring of Cells in vitro

This book presents a substantial description of the principles and applications of digital holography. The first part of the book deals with mathematical basics and the linear filtering theory necessary to approach the topic. The next part describes the fundamentals of diffraction theory and exhaustively details the numerical computation of diffraacted fields using FFT algorithms. A thorough presentation of the principles of holography and digital holography, including digital color holography, is proposed in the third part. A special section is devoted to the algorithms and methods for the numerical reconstruction of holograms. There is also a chapter devoted to digital holographic interferometry with applications in holographic microscopy, quantitative phase contrast imaging, multidimensional deformation investigations, surface shape measurements, fluid mechanics, refractive index investigations, synthetic aperture imaging and information encrypting. Keys so as to understand the differences between digital holography and speckle interferometry and examples of software for hologram reconstructions are also treated in brief. Contents 1. Mathematical Prerequisites. 2. The Scalar Theory of Diffraction. 3. Calculating Diffraction by Fast Fourier Transform. 4. Fundamentals of Holography. 5. Digital Off-Axis Fresnel Holography. 6. Reconstructing Wavefronts Propagated through an Optical System. 7. Digital Holographic Interferometry and its Applications. Appendix. Examples of Digital Hologram Reconstruction Programs

Intelligent Robotics and Applications

This book presents peer-reviewed articles from the 20th International Symposium on Optomechatronic Technologies (ISOT 2019), held in Goa, India. The symposium brought together students, researchers, professionals, and academicians in the field of optomechatronics and related areas on a common platform conducive to academic interaction with business professionals.