Indoor Visible Light Communication Without Line Of Sight

Multimedia Technology IV is a collection of papers from the 4th International Conference on Multimedia Technology (ICMT 2015, Sydney, Australia, 28-29 March 2015). The book discusses a wide range of topics, including: Image and signal processing Video and audio processing Multimedia data communication and transmission, and Multimedia tools.Pre

Balancing theoretical analysis and practical advice, this book describes all the underlying principles required to build high performance indoor optical wireless communication (OWC) systems based on visible and infrared light, alongside essential techniques for optimising systems by maximising throughput, reducing hardware complexity and measuring performance effectively. It provides a comprehensive analysis of information rate-, spectral- and power-efficiencies for single and multi-carrier transmission schemes, and a novel analysis of non-linear signal distortion, enabling the use of off-the-shelf LED technology. Other topics covered include cellular network throughput and coverage, static resource partitioning and dynamic interference-aware scheduling, realistic light propagation modelling, OFDM, optical MIMO transmission and nonlinearity modelling. Covering practical techniques for building indoor optical wireless cellular networks supporting multiple users and guidelines for 5G cellular system studies, in addition to physical layer issues, this is an indispensable resource for academic researchers, professional engineers and graduate students working in optical communications.

With the ubiquitous diffusion of the IoT, Cloud Computing, 5G and other evolved wireless technologies into our daily lives, the world will see the Internet of the future expand ever more quickly. Driving the progress of communications and connectivity are mobile and wireless technologies, including traditional WLANs technologies and low, ultra-power, short and long-range technologies. These technologies facilitate the communication among the growing number of connected devices, leading to the generation of huge volumes of data. Processing and analysis of such "big data" brings about many opportunities, as well as many challenges, such as those relating to efficient power consumptions, security, privacy, management, and quality of service. This book is about the technologies, opportunities and challenges that can drive and shape the networks of the future. Written by established international researchers and experts, Networks of the Future answers fundamental and pressing research challenges in the field, including architectural shifts, concepts, mitigation solutions and techniques, and key technologies in the areas of networking. The book starts with a discussion on Cognitive Radio (CR) technologies as promising solutions for improving spectrum utilization, and also highlights the advances in CR spectrum sensing techniques and resource management methods. The second part of the book presents the latest developments and research in the areas of 5G technologies and Software Defined Networks (SDN). Solutions to the most pressing challenges facing the adoption of 5G technologies are also covered, and the new paradigm known as Fog Computing is examined in the context of 5G networks. The focus next shifts to efficient solutions for future heterogeneous networks. It consists of a collection of chapters that discuss self-healing solutions, dealing with Network Virtualization, QoS in heterogeneous networks, and energy efficient techniques for Passive Optical Networks and Wireless Sensor Networks. Finally, the areas of IoT and Big Data are discussed, including the latest developments and future perspectives of Big Data and the IoT paradigms.

Provides the foundations and principles needed for addressing the various challenges of developing smart cities Smart cities are emerging as a priority for research and development across the world. They open up significant opportunities in several areas, such as economic growth, health, wellness, energy efficiency, and transportation, to promote the sustainable development of cities. This book provides the basics of smart cities, and it examines the possible future trends of this technology. Smart Cities: Foundations, Principles, and Applications provides a systems science perspective in presenting the foundations and principles that span multiple disciplines for the development of smart cities. Divided into three parts—foundations, principles, and applications—Smart Cities addresses the various challenges and opportunities of creating smart cities and all that they have to offer. It also covers smart city theory modeling and simulation, and examines case studies of existing smart cities from all around the world. In addition, the book: Addresses how to develop a smart city and how to present the state of the art and practice of them all over the world Focuses on the foundations and principles needed for advancing the science, engineering, and technology of smart cities—including system design, system verification, real-time control and adaptation, Internet of Things, and test beds Covers applications of smart cities as they relate to smart transportation/connected vehicle (CV) and Intelligent Transportation Systems (ITS) for improved mobility, safety, and environmental protection Smart Cities: Foundations, Principles, and Applications is a welcome reference for the many researchers and professionals working on the development of smart cities and smart city-related industries.

Visible Light CommunicationsTheory and ApplicationsCRC Press

In the past few decades, the optical communication industry has explored multiple degrees of freedom of the photon, such as time, wavelength, amplitude, phase, polarization, and space, to significantly reduce the cost/bit of data transmission by increasing the capacity per fiber through multiplexing technology and by reducing the size and power through electronic and photonic integration. This book aims to explore the latest advancements in this industry, including the technologies in devices, systems, and network levels with applications from short-reach chip-to-chip interconnections to long-haul backbone communications at the trans-oceanic distance.

This volume constitutes the refereed proceedings of the 3rd International Conference on Advanced Communication and Networking, ACN 2011, held in Brno, Czech Republik, in June 2011. The 57 revised full papers presented in this volume were carefully reviewed and selected from numerous submissions. The papers focus on the various aspects of progress in Advanced Communication and Networking with computational sciences, mathematics and information technology and address all current issues of communication basic and infrastructure, networks basic and management, multimedia application, image, video, signal and information processing.

The LNCS volume 10996 constitutes the proceedings of the 13th Chinese Conference on Biometric Recognition, held in Urumchi, China, in August 2018. The 79 full papers and 67 poster papers presented were carefully reviewed and selected from 112 submissions. The papers cover a wide range of topics such as Biometrics, Speech recognition, Activity recognition and understanding, Online handwriting recognition, System forensics, Multi-factor authentication, Graphical and visual passwords.

Physical limitations on wireless communication channels impose huge challenges to reliable communication. Bandwidth

limitations, propagation loss, noise and interference make the wireless channel a narrow pipe that does not readily accommodate rapid flow of data. Thus, researches aim to design systems that are suitable to operate in such channels, in order to have high performance quality of service. Also, the mobility of the communication systems requires further investigations to reduce the complexity and the power consumption of the receiver. This book aims to provide highlights of the current research in the field of wireless communications. The subjects discussed are very valuable to communication researchers rather than researchers in the wireless related areas. The book chapters cover a wide range of wireless communication topics.

This book written for students of electronics and communication, students of computer science and communications engineers addresses topics such as Introduction of CRN, Advanced spectrum sensing techniques, Cooperative sensing techniques, Distributed sensing techniques, Issues in advanced sensing techniques, and Applications of 5G Networks. It provides new algorithms, explores recent results, and evaluates the performance of technologies in use in this area. It also provides new research topics and sensing techniques related to 5G networks for researchers.

This book discusses the fundamental aspects of multiple-source Optical Wireless Applications, including Visible Light Communications (VLC). Moreover, the authors explore VLC performance in several conventional household layouts and investigate the impact of these layouts on VLC. Multiple sources increase multipath distortion. Multi-input- Multi-Output (MIMO) techniques will be included as they provide either reliability improvement or bandwidth efficiency increase. Based on these topics, the book further explores VLC performance in real applications, such as aircraft cabin wireless communications. In addition, the authors describe the Lambertian emitting pattern of LEDs and the diffused features in indoor environments. Based on the theory, they trace light pulses to establish a MIMO indoor wireless channel model on specific sources layout. Next, they generate test data to simulate BER distribution in a room and calculate the outage. Furthermore, addresses the performance improvement when MIMO techniques are applied. Lastly, the authors investigate VLC performance in specific applications, including for aircraft on-board wireless communications. Finally, the pitfalls of MIMO systems are discussed.

The field of Optical Wireless Communications (OWC) has seen rapid development during the recent years. This growing popularity is due to several characteristics of considerable importance to consumer electronics products, such as large bandwidth that is also not having spectrum regulations imposed, low cost, and license free operation. As a branch of OWC, visible light communication (VLC) systems have their own unique advantages, with several new technologies, products and patents having been developed during since the end of last century. In this research, a VLC system for indoor application is proposed. In this work, we focus on reducing cost, and for that, we had to make appropriate selection of system's components, e.g. modulation, coding, filtering. Our objective was to achieve acceptable bit error rate (BER) performance for indoor use, with a low cost system. Through our research we met this objective. Our designs were evaluated through computer simulations. The acquired results proved the suitability of the proposed schemes and the performance's degree of dependency on several parameters such as distance, incidence angle and irradiance angle. A software tool was created allowing easy assessment of the communication system. It is using a user friendly GUI through which the user enters the system's parameters and the system outputs the corresponding BER value.

This book sets out the theoretical principles of visible light communication (VLC), and outlines key applications of this cutting-edge technology.

In recent years, wireless communications have significantly evolved due to the advanced technology of smartphones;, portable devices; and the rapid growth of Internet of Things, e-Health, and intelligent transportation systems . Moreover, there is anare increasing need fors of emerging intelligent services like positioning and sensing in athe future intelligence society. Recent years have witnessed the growing research interests and activities in the communication and intelligencet services in the optical wireless spectrum, as a complementary technology to more established radio frequency (RF)-based systems, to overcome the spectrum sparsity and increases data rates in crowded locations, due to the limited transmission range and interference. The OWC technology offers advantages such as free license, wide bandwidth, inherent security, no RF electromagnetic interference, and immunity to electromagnetic interference. The attractive applications of the optical spectrum include ultra-violet tactic communication, blue/green underwater communication, visible light positioning, and vehicular communication/sensing in intelligent transportation systems. The present lissue, as named "Visible Light Communication and Positioning", focuses on visible light communication and visible light positioning, where four papers are on visible light communication and three papers are on visible light positioning. For visible light communication, the published works focus on the devices, the physical-layer techniques, and the system work aspects. Besides VLC, visible light positioning works include fingerprint-based indoor positioning system for multiple reflections, the impact of LED tilt on visible light positioning accuracy, and a mobile optoelectronic tracking system based on feedforward control.

The technical program of IMICPW 2019 aims to present the new trends, status and address the new challenges in the field of Microwave integrated circuits, Photonics and wireless networks This conference will provide the platform for bridging the gap between the Microwave, photonics and wireless communication field A broad range of topics related to high frequency applications from materials to integrated circuits, simulation, measurement, millimeter wave and terahertz technology, Photonics for Green Energy, Silicon Photonics and Photonic Integrated Circuits and Microwave Photonics, wireless communication, 5G networks, IoT etc will be covered The conference will include keynote address and invited talks from academicians and Industrial experts from reputed organization from India and abroad This conference provides many opportunities for networking and interaction with eminent experts in a wide variety of specialties

The field of visible light communication (VLC) has diverse applications to the end user including streaming audio, video, high-speed data browsing, voice over internet and online gaming. This comprehensive textbook discusses fundamental aspects,

research activities and modulation techniques in the field of VLC. Visible Light Communication: A Comprehensive Theory and Applications with MATLAB® discusses topics including line of sight (LOS) propagation model, non-line of sight (NLOS) propagation model, carrier less amplitude and phase modulation, multiple-input-multiple-output (MIMO), non-linearities of optical sources, orthogonal frequency-division multiple access, non-orthogonal multiple access and single-carrier frequency-division multiple access in depth. Primarily written for senior undergraduate and graduate students in the field of electronics and communication engineering for courses on optical wireless communication and VLC, this book: Provides up-to-date literature in the field of VLC Presents MATLAB codes and simulations to help readers understand simulations Discusses applications of VLC in enabling vehicle to vehicle (V2V) communication Covers topics including radio frequency (RF) based wireless communications and VLC Presents modulation formats along with the derivations of probability of error expressions pertaining to different variants of optical OFDM

This book includes the latest research presented at the International Conference on Artificial Intelligence in Renewable Energetic Systems held in Tipaza, Algeria on October 22–24, 2017. The development of renewable energy at low cost must necessarily involve the intelligent optimization of energy flows and the intelligent balancing of production, consumption and energy storage. Intelligence is distributed at all levels and allows information to be processed to optimize energy flows according to constraints. This thematic is shaping the outlines of future economies of and offers the possibility of transforming society. Taking advantage of the growing power of the microprocessor makes the complexity of renewable energy systems accessible, especially since the algorithms of artificial intelligence make it possible to take relevant decisions or even reveal unsuspected trends in the management and optimization of renewable energy flows. The book enables those working on energy systems and those dealing with models of artificial intelligence to combine their knowledge and their intellectual potential for the benefit of the scientific community and humanity.

A comprehensive review of position location technology — from fundamental theory to advanced practical applications Positioning systems and location technologies have become significant components of modern life, used in a multitude of areas such as law enforcement and security, road safety and navigation, personnel and object tracking, and many more. Position location systems have greatly reduced societal vulnerabilities and enhanced the quality of life for billions of people around the globe — yet limited resources are available to researchers and students in this important field. The Handbook of Position Location: Theory, Practice, and Advances fills this gap, providing a comprehensive overview of both fundamental and cutting-edge techniques and introducing practical methods of advanced localization and positioning. Now in its second edition, this handbook offers broad and in-depth coverage of essential topics including Time of Arrival (TOA) and Direction of Arrival (DOA) based positioning, Received Signal Strength (RSS) based positioning, network localization, and others. Topics such as GPS, autonomous vehicle applications, and visible light localization are examined, while major revisions to chapters such as body area network positioning and digital signal processing for GNSS receivers reflect current and emerging advances in the field. This new edition: Presents new and revised chapters on topics including localization error evaluation, Kalman filtering, positioning in inhomogeneous media, and Global Positioning (GPS) in harsh environments Offers MATLAB examples to demonstrate fundamental algorithms for positioning and provides online access to all MATLAB code Allows practicing engineers and graduate students to keep pace with contemporary research and new technologies Contains numerous application-based examples including the application of localization to drone navigation, capsule endoscopy localization, and satellite navigation and localization Reviews unique applications of position location systems, including GNSS and RFID-based localization systems The Handbook of Position Location: Theory, Practice, and Advances is valuable resource for practicing engineers and researchers seeking to keep pace with current developments in the field, graduate students in need of clear and accurate course material, and university instructors teaching the fundamentals of wireless localization.

The 2013 International Conference on Cyber Science and Engineering (CyberSE 2013) will be held on in Guangzhou, China during December 14– 15, 2013. CyberSE is an annual conference to call together researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Cyber Science and Engineering. CyberSE 2013 is sponsored by International Association for Cyber Science and Engineering, Hong Kong. CyberSE 2013 has received more than 200 submissions from 15 countries and regions. The papers come from both academia and industry reflecting the international flavor of this event in the topics of Cyber Science and Engineering. About 20 PC members and 40 International reviewers worked hard in reviewing the submissions. Based on the review reports, about 63 papers were accepted to be presented in CyberSE 2013 by the chairs. The papers were grouped into five sessions viz., 1. Computer and Information Technologies, 2. Communication Technologies, 3. Artificial Intelligence, 4. Management and Services Science, 5. Circuits and Systems. All the accepted papers have been presented on the conference, mainly by oral presentations. During the conference, many novel research works caught the attentions of the participants. The participants came to an agreement that they will participate in the CyberSE 2014 next year. All the presented papers will be published by DEStech Publications, USA. DEStech will have the proceeding indexed in ISI (Institute of Scientific Information), CPCI-S (ISTP), Google Book Search, EI and other worldwide online citation of qualified papers. We express our thanks to all the members of the General Committee Chairs, Program Committee Chairs, Technical Program Committee and Volunteers who worked so hard to prepare the conference and chair the five sessions in CyberSE 2013 . We hope that CyberSE 2013 will be successful and enjoyable to all participants. We look forward to seeing all of you next year at the CyberSE 2014. Deyao Tan, International Association for Cyber Science and Engineering, China

This proceedings brings together 59 selected articles presented at the joint conferences of the International Conference on Management, Information and Communication (ICMIC2016) and the International Conference on Optics and Electronics Engineering (ICOEE2016), which were held in Guilin, China, during May 28–29, 2016. ICMIC2016 and ICOEE2016 provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their latest findings and results in the development in Information Management, Communication, Optics and Electronics host by ICMIC2016 and ICOEE2016. The proceedings collected the latest research results and applications in the related areas. We hope to enlighten readers with some latest developments in Information Management, and Optics Electronics presented at the joint conferences. This proceedings volume contains selected papers presented at the 2014 International Conference on Future Mechatronics and Automation, held in Beijing, China. Contributions cover the latest developments and advances in the field of Mechatronics and Automation.

The 2nd Edition of Optical Wireless Communications: System and Channel Modelling with MATLAB® with additional new materials, is a self-contained volume that provides a concise and comprehensive coverage of the theory and technology of optical wireless communication systems (OWC). The delivery method makes the book appropriate for students studying at undergraduate and graduate levels as well as researchers and professional engineers working in the field of OWC. The book gives a detailed description of OWC, focusing mainly on the infrared and visible bands, for indoor and outdoor applications. A major attraction of the book is the inclusion of Matlab codes and simulations results as well as experimental test-beds for free space optics and visible light communication systems. This valuable resource will aid the readers in understanding the concept, carrying out extensive analysis, simulations, implementation and evaluation of OWC links. This 2nd edition is structured into nine compact chapters that cover the main aspects of OWC systems: History, current state of the art and challenges Fundamental principles Optical source and detector and noise sources Modulation, equalization, diversity techniques Channel models and system performance analysis Visible light communications Terrestrial free space optics communications Relay-based free space optics communications Matlab codes. A number of Matlab based simulation codes are included in this 2nd edition to assist the readers in mastering the subject and most importantly to encourage them to write their own simulation codes and enhance their knowledge.
This book brings together papers from the 2018 International Conference on Communications, Signal Processing, and Systems, which was held in Dalian, China on July 14–16, 2018. Presenting the latest developments and discussing the interactions and links between these multidisciplinary fields, the book spans topics ranging from communications, signal processing and systems. It is aimed at undergraduate and graduate electrical engineering, computer science and mathematics students, researchers and engineers from academia and industry as well as government employees. Visible light communication (VLC) has drawn much attention recently. Compared to the traditional radio frequency wireless communications (RFWC), VLC has many advantages, such as worldwide availability, high security, large bandwidth, immunity to radio frequency interference, and unlicensed spectrum. Due to its superiority, VLC has become a complementary solution to the overcrowded RFWC. This book intends to introduce the latest research progress in VLC, which covers the novel modulation techniques for VLC, the multiple input multiple output (MIMO) techniques for VLC, the collaborative communication techniques for VLC, and the practical applications of VLC. The book is a useful resource for researchers, engineers, scientists, and students interested in understanding and designing VLC systems.
This book focuses on optical wireless communications (OWC), an emerging technology with huge potential for the provision of pervasive and reliable next-generation communications networks. It shows how the development of novel and efficient wireless technologies can contribute to a range of transmission links essential for the heterogeneous networks of the future to support various communications services and traffic patterns with ever-increasing demands for higher data-transfer rates. The book starts with a chapter reviewing the OWC field, which explains different sub-technologies (visible-light, ultraviolet (UV) and infrared (IR) communications) and introduces the spectrum of application areas (indoor, vehicular, terrestrial, underwater, intersatellite, deep space, etc.). This provides readers with the necessary background information to understand the specialist material in the main body of the book, which is in four parts. The first of these deals with propagation modelling and channel characterization of OWC channels at different spectral bands and with different applications. The second starts by providing a unified information-theoretic treatment of OWC and then discusses advanced physical-layer methodologies (including, but not limited to: advanced coding, modulation diversity, cooperation and multi-carrier techniques) and the ultimate limitations imposed by practical constraints. On top of the physical layer come the upper-layer protocols and cross-layer designs that are the subject of the third part of the book. The last part of the book features a chapter-by-chapter assessment of selected OWC applications. Optical Wireless Communications is a valuable reference guide for academic researchers and practitioners concerned with the future development of the world's communication networks. It succinctly but comprehensively presents the latest advances in the field.
This book focuses on the most critical technical aspects of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications. It covers the smart city concept and architecture and explains how V2V and V2I fit into it. It describes the wireless communication protocols for V2V and V2I. It then explains the hardware design process for vehicle communication transceiver and antenna systems. It explains next-generation wireless technologies and their requirements for vehicle communication protocols. Case studies provide the latest V2V and V2I commercial design details. Finally, it describes how to implement vehicle communication protocol from practical hardware design angle.
Visible Light Communications, written by leading researchers, provides a comprehensive overview of theory, stimulation, design, implementation, and applications. The book is divided into two parts – the first devoted to the underlying theoretical concepts of the VLC and the second part covers VLC applications. Visible Light Communications is an emerging topic with multiple functionalities including data communication, indoor localization, 5G wireless communication networks, security, and small cell optimization. This concise book will be of valuable interest from beginners to researchers in the field.
A complete and comprehensive reference on modulation and signal processing for visible light communication This informative new book on state-of-the-art visible light communication (VLC) provides, for the first time, a systematical and advanced treatment of modulation and signal processing for VLC. Visible Light Communications: Modulation and Signal Processing offers a practical guide to designing VLC, linking academic research with commercial applications. In recent years, VLC has attracted attention from academia and industry since it has many advantages over the traditional radio frequency, including wide unregulated bandwidth, high security, and low cost. It is a promising complementary technique in 5G and beyond wireless communications, especially in indoor applications. However, lighting constraints have not been fully considered in the open literature when considering VLC system design, and its importance has been

underestimated. That's why this book—written by a team of experts with both academic research experience and industrial development experience in the field—is so welcome. To help readers understand the theory and design of VLC systems, the book: Details many modern techniques on both modulation and signal processing aspects Links academic research with commercial applications in visible light communications as well as other wireless communication systems Combines theoretical rigor with practical examples in presenting optical camera communication systems Visible Light Communications: Modulation and Signal Processing serves as a useful tool and reference book for visible light communication professionals, as well as wireless communication system professionals and project managers. It is also an important guide for undergraduates and graduates who want to conduct research in areas of wireless communications.

The volume includes a set of selected papers extended and revised from the 2011 International Conference on Mechanical Engineering and Technology, held on London, UK, November 24-25, 2011. Mechanical engineering technology is the application of physical principles and current technological developments to the creation of useful machinery and operation design. Technologies such as solid models may be used as the basis for finite element analysis (FEA) and / or computational fluid dynamics (CFD) of the design. Through the application of computer-aided manufacturing (CAM), the models may also be used directly by software to create "instructions" for the manufacture of objects represented by the models, through computer numerically controlled (CNC) machining or other automated processes, without the need for intermediate drawings. This volume covers the subject areas of mechanical engineering and technology, and also covers interdisciplinary subject areas of computers, communications, control and automation. We hope that researchers, graduate students and other interested readers benefit scientifically from the book and also find it stimulating in the process.

This two-volume set LNICST 301 -302 constitutes the post-conference proceedings of the Third EAI International Conference on Advanced Hybrid Information Processing, ADHIP 2019, held in Nanjing, China, in September 2019. The 101 papers presented were selected from 237 submissions and focus on hybrid big data processing. Since information processing has acted as an important research domain in science and technology today, it is now to develop deeper and wider use of hybrid information processing, especially information processing for big data. There are more remaining issues waiting for solving, such as classification and systemization of big data, objective tracking and behavior understanding in big multimedia data, encoding and compression of big data.

This book demonstrates the research on VLC based indoor localization in four aspects: first, it constructs the concept and model of the system; second, positioning algorithms, as the main issue in indoor localization, are detailed; third, many approaches are proposed to further improve the positioning performance; fourth, challenges will be detailed. Impulse response with multipath reflections are analyzed. Orthogonal frequency division multiplexing (OFDM) is proposed, and positioning performance is largely improved compared to On-off-keying (OOK) modulation. The readers will get a broad view of VLC based indoor localization from the background to the future challenges.

Enabling Technologies for Next Generation Wireless Communications provides up-to-date information on emerging trends in wireless systems, their enabling technologies and their evolving application paradigms. This book includes the latest trends and developments toward next generation wireless communications. It highlights the requirements of next generation wireless systems, limitations of existing technologies in delivering those requirements and the need to develop radical new technologies. It focuses on bringing together information on various technological developments that are enablers vital to fulfilling the requirements of future wireless communication systems and their applications. Topics discussed include spectrum issues, network planning, signal processing, transmitter, receiver, antenna technologies, channel coding, security and application of machine learning and deep learning for wireless communication systems. The book also provides information on enabling business models for future wireless systems. This book is useful as a resource for researchers and practitioners worldwide, including industry practitioners, technologists, policy decision-makers, academicians, and graduate students.

This book aims to give an overview of recent developments in indoor near-infrared optical wireless communication technologies and systems, including basic theories, operating fundamentals, system architectures, modelling, experimental demonstrations, advanced techniques, and most recently, the research efforts towards integrations. Both line-of-sight and diffusive-signals-based options will be reviewed, to provide readers a complete picture about this rapidly developing area, which targets the provision of high-speed wireless connectivity to end- users in indoor environments, such as offices, homes and shopping centres, to satisfy the growing high-speed communication requirement. Provides a systematic approach for the fundamentals of indoor optical wireless communications. Provides an overview of recent developments in indoor infrared optical wireless communications, including theoretical fundamentals. Examines system architectures, modelling, experimental demonstrations, and the research efforts towards integrations. Dr. Ke Wang is an Australian Research Council (ARC) DECRA Fellow and a senior lecturer in the School of Engineering, Royal Melbourne Institute of Technology (RMIT University), VIC, Australia. He worked with the University of Melbourne, Australia, and Stanford University, California, before joining RMIT University. He has published over 110 peer-reviewed papers in top journals and leading international conferences, including over 20 invited papers. He has been awarded several prestigious national and international awards as recognition of research contributions, such as the Victoria Fellowship, the AIPS Young Tall Poppy Science Award, and the Marconi Society Paul Baran Young Scholar Award. His major areas of interest include: silicon photonics integration, opto-electronics integrated devices and circuits, nanophotonics, optical wireless technology for short-range applications, quasi-passive reconfigurable devices and applications and optical interconnects in data -centres and high-performance computing.

This book focuses on the emerging research topic "green (energy efficient) wireless networks" which has drawn huge attention recently from both academia and industry. This topic is highly motivated due to important environmental, financial, and quality-of-experience (QoE) considerations. Specifically, the high energy consumption of the wireless networks manifests in approximately 2% of all CO_2 emissions worldwide. This book presents the authors' visions and solutions for deployment of energy efficient (green) heterogeneous wireless communication networks. The book consists of three major parts. The first part provides an introduction to the "green networks" concept, the second part targets the green multi-homing resource allocation problem, and the third chapter presents a novel deployment of device-to-device (D2D) communications and its successful integration in Heterogeneous Networks (HetNets). The book is novel in that it specifically targets green networking in a heterogeneous wireless medium, which represents the current and future wireless communication medium faced by the existing and next generation communication networks. The book focuses on multi-homing resource allocation, exploiting network cooperation, and integrating different and new network technologies (radio frequency and VLC), expanding the network coverage and integrating new device centric communication paradigms such as D2D Communications. Whilst the book discusses a significant research topic supported with advanced mathematical analysis, the resulting algorithms and solutions are explained and summarized in a way that is easy to follow and grasp. This book is suitable for networking and telecommunications engineers, researchers in industry and academia, as well as students and instructors.

Offers concise, practical knowledge on modern communication systems to help students transition smoothly into the workplace and beyond This book presents the most relevant concepts and technologies of today's communication systems and presents them in a concise and intuitive manner. It covers advanced topics such as Orthogonal Frequency-Division Multiplexing (OFDM) and Multiple-Input Multiple-Output (MIMO) Technology, which are enabling technologies for modern communication systems such as WiFi (including the latest enhancements) and LTE-Advanced. Following a brief introduction to the field, Digital Communication for Practicing Engineers immerses readers in the

theories and technologies that engineers deal with. It starts off with Shannon Theorem and Information Theory, before moving on to basic modules of a communication system, including modulation, statistical detection, channel coding, synchronization, and equalization. The next part of the book discusses advanced topics such as OFDM and MIMO, and introduces several emerging technologies in the context of 5G cellular system radio interface. The book closes by outlining several current research areas in digital communications. In addition, this text: Breaks down the subject into self-contained lectures, which can be read individually or as a whole Focuses on the pros and cons of widely used techniques, while providing references for detailed mathematical analysis Follows the current technology trends, including advanced topics such as OFDM and MIMO Touches on content this is not usually contained in textbooks such as cyclo-stationary symbol timing recovery, adaptive self-interference canceler, and Tomlinson-Harashima precoder Includes many illustrations, homework problems, and examples Digital Communication for Practicing Engineers is an ideal guide for graduate students and professionals in digital communication looking to understand, work with, and adapt to the current and future technology.

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