

Special Session on Green and Sustainable Optical Wireless Communication systems for IoT applications

The application of IoT is witnessing an unprecedented surge across various sectors, from domestic homes to smart vehicles, smart wearables, digital health and industrial (I4.0) applications. According to Statista, there are over 15.14 billion connected IoT devices as of 2023 [1]. As we look towards a future where billions of devices communicate seamlessly, the role of advanced wireless technologies becomes not just significant but indispensable. This growth underscores the need for innovative, sustainable and green solutions to power and connect these IoT devices.

This special session is dedicated to discussing innovative approaches in IoT connectivity, with a key emphasis on, but not limited to, the use of solar cell-based LiFi/VLC/FSO systems. These self-power OWC systems are uniquely capable of offering medium data rates up to 100Mbps, tailored for various IoT applications. Beyond data transmission, they also have the capability to harvest energy. This dual function allows them to potentially self-power IoT devices, providing a sustainable solution for connectivity at the physical layer. However, there is still a need for more research and advancement in tackling the challenges of self-power LiFi/ VLC/FSO links.

This special session is inviting you to submit the latest research and papers on tackling the challenges in the areas of design of solar cell-based optical transceivers, LiFi receivers, Self-power LiFi systems and subsystems and challenges, signal processing, noises, channel modelling, data rates, bandwidth enhancement, spectral efficiency, applications of self-power OWC/LiFi connectivity for IoT applications, machine learning implementation to improve self-powered OWC systems and its applications.



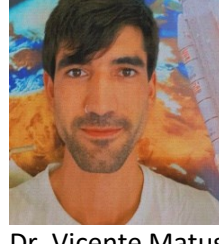
Dr. M. Ijaz is Reader (Associate Prof.) and International Lead at Department of Engineering, Manchester Metropolitan University, UK.

He is also head of Laser and Optics Communication (LOC) lab from 2017 at the department where he is leading applied research and has been working with a number of industries, technopreneurs, international collaborators and successfully leading knowledge transfer partnership projects funded by Innovate UK in the areas of optical wireless communications, LiFi, FSO, embedded systems, IoT, cloud, communication networks 6G, digital signal processing and smart sensors design.



Dr Othman I. Younus is currently a Research Fellow and Associate Lecturer in Optical Communications in the same institute and serves as England's representative of IEEE Young Professionals in the UK and Ireland section. He is also a member of IET, the Photonics Technology Lab and the Northumbria Space Technology Laboratory.

His research focuses on optical wireless communication with the integration of artificial neural networks-based equalizers, localization, and extended realities. He has published over 20 scholarly publications in high impact conferences and Journals.



Dr. Vicente Matus got his PhD at the University of Las Palmas de Gran Canaria (ULPGC), Spain. Currently, he is a postdoctoral researcher at the Institute for Technological Development and Innovation in Communications (IDeTIC-ULPGC, Spain) and guest researcher at the Instituto de Telecomunicações (IT) Aveiro, Portugal.

His research interests are the development of optical wireless communication systems using camera-based receivers for outdoor applications. His work is funded by the Canary Islands research agency (ACIISI) under Catalina Ruiz Grant 2022.



Nicolas Krommenacker is currently Associate Professor in Networks and Telecommunications at Lorraine University, France. He is also a member of the Centre de Recherche en Automatique de Nancy (CRAN - CNRS UMR 7039), and head of the research team on autonomous and resilient networks. He obtained his PhD in computer engineering and information technology in 2002. His research focuses on wireless communication systems for industrial applications and has been the subject of more than 60 publications. He has also participated in several national and international research projects. He focused his research on visible light communication systems and green networks.

Prospective authors are invited to submit original and unpublished work on the following research topics related to this Special Session:

- Solar cell-based LiFi/VLC/FSO Transceivers
- Organic solar-based receivers
- Self-power LiFi /VLC systems and sub-systems
- Green VLC-based IoT systems
- Bandwidth and Spectral efficiency enhancement for Self-power VLC
- Denoising self-power OWC Transceivers
- Energy Harvesting and storage for VLC/FSO system

- Simulation and Design of green and sustainable IoT systems using VLC
- Channel modelling
- Self-powering wearable technologies using VLC
- Smart farming connectivity using OWC
- Signal processing / Modulation schemes for green and sustainable OWC

References

- [1] L. S. Vailshery, 'IoT-connected devices worldwide 2019-2030', Statista. Accessed: Nov. 16, 2023. [Online]. Available: <https://www.statista.com/statistics/1183457/iot-connected-devices-worldwide/>