

## Working Group 1, Milestone M1.1

### Channel simulation and design of VLC systems



## Introduction

Based on the overall goal of WG1 to develop point-to-point and high performance OWC based solutions for ultra-high-speed links for sub-metre applications, Milestone 1.1 has been accomplished, as demonstrated in the internal documents discussed in the project meetings as well as publications, see the list below.

### 1. Input documents

- Institut Fresnel (FR), Oledcomm (FR) - Optical-CDMA for Uplink Transmission in Medical Extra-Wireless Body Area Networks
- Instituto de Telecomunicações (PT) - Optimized Analog Multi-Band Carrierless Amplitude and Phase Modulation for Visible Light Communication-Based Internet of Things Systems
- Scuola Superiore Sant'Anna (IT) - Optical Wireless Communication for High Energy Physics
- Harokopio University of Athens (GR) - Optimizing Optical Wireless Topologies for Massive Machine Type Communications
- University of Luxembourg (LU)– IPv6 for IoT Device to Device Communications
- “Neuromorphic Sensors with Visible Light Communication” by M. Hulea, George-Iulian Uleru, Othman Isam Younus, Z. Ghassemlooy, Sujan Rajbhandari
- “Pulse amplitude modulation for electro-optical SNN” by George-Iulian Uleru, M. Hulea, Othman Isam Younus, Z. Ghassemlooy, Sujan Rajbhandari
- “Experimental validation of analog m-CAP receivers for Internet of Things” by Luís Rodrigues, Mónica Figueiredo, Luís Nero Alves, Zabih Ghassemlooy

### 2. Publications

- Mircea Hulea, Zabih Ghassemlooy, Sujan Rajbhandari, Othman Isam Younus, Alexandru Barleanu, Optical Axons for Electro-Optical Neural Networks, *Sensors* 2020, 21, 6119.
- Luis Rodrigues, Mónica Figueiredo, Luis Nero Alves, Optimized Analog Multi-Band Carrierless Amplitude and Phase Modulation for Visible Light Communication Based Internet of Things Systems, *Sensors* 2021, 21, 2537.
- Mircea Hulea, George-Iulian Uleru, Constantin Florin Caruntu, Adaptive SNN for anthropomorphic finger control, *Sensors* 2021, 21, 2730
- Mircea Hulea, Zabih Ghassemlooy, Othman Isam Younus, Sujan Rajbhandari, “Influence of optical axons on the synaptic weights”, *ISWCS* 2021.
- George-Iulian Uleru, Mircea Hulea, “Influence of capacitor variability on the electronic spiking neurons”, *ICSTCC* 2021.
- T. Kamalakis, Z. Ghassemlooy, S. Zvanovec, L. Nero Alves, Analysis and simulation of a hybrid visible-light/infrared optical wireless network for IoT applications, *Journal of Optical Communications and Networking*, vo.14, issue 3, pp. 69-78, 2022.
- M. J. Hasan, M. A. Khalighi, V. Jungnickel, L. N. Alves and B. Béchadergue, "An Energy-Efficient Optical Wireless OFDMA Scheme for Medical Body-Area Networks," in *IEEE*

Transactions on Green Communications and Networking, doi: 10.1109/TGCN.2022.3161413, 2022.

- O. Haddad, M.A. Khalighi, Z. Ghassemlooy, A. Dowhuszko, S. Zvanovec, "Performance Analysis of Multiple Access m-CAP for Optical-Based Intra-WBAN Links", International Symposium on Communication Systems, Networks and Digital Signal Processing, Porto, Portugal, July 2022.
- Luis Rodrigues, Mónica Figueiredo, Z. Ghassemlooy, Luis Nero Alves, "Experimental Validation of Analog m-CAP Receivers for Internet of Things", International Symposium on Communication Systems, Networks and Digital Signal Processing, Porto, Portugal, July 2022.
- Luis Rodrigues, Mónica Figueiredo, Z. Ghassemlooy, Luis Nero Alves, "VLC frontends for IoT applications", West Asian Symposium on Optical and Millimeter-wave Wireless Communications, Tabriz, Iran, May 2022.