



Neuromorphic computing and machine learning applications in optical communication systems

Prof Adonis Bogris

Department of Informatics and Computer Engineering, UNIWA, Greece

Lecture 1. 1st June 2021, 4pm - 6pm (UK time);

Lecture 2. 2nd June 2021, 4pm - 6pm (UK time);

Lecture 3. 3rd June 2021, 10am - 12 pm (UK time);

Lecture 4. 4th June 2021, 10am – 12 pm (UK time);

Abstract:

Digital signal processing and its synergy with optical signal processing is an indispensable tool which enables high speed communications in either short-reach or long-haul transmission systems. As the baud rate and/or the modulation format complexity increases, the signal processing must become even more elegant so as to protect the transmitted signals from transceiver imperfections and the interplay of chromatic dispersion and fiber non-linearity. Very recently, machine learning techniques and/or hardware accelerators based on neuromorphic computing emerge as two promising ways to enhance the capabilities of signal processing especially in harsh nonlinear environments for symbol rates exceeding 50 Gbaud.

The seminar will provide a state of the art overview of the emerging neuromorphic computing and machine learning techniques and models towards the mitigation of transmission impairments in optical communication systems. Special focus will be given to:

- **Intensity modulation – direct detection systems at high baudrate (> 56 Gbaud)**
- **Digital coherent systems based on polarization multiplexing and M-QAM modulation formats.**

The seminar will reveal the potential of analog neuromorphic computing and machine learning technologies performance and complexity-wise with respect to other competing digital signal processing techniques.

Short Bio:

Prof Adonis Bogris received the B.S. degree in informatics, the M.Sc. degree in telecommunications, and the PhD degree from the National and Kapodistrian University of Athens. Currently he is a professor at the University of West Attica. Prof A. Bogris is the head of broadband communications and networks unit of the Parallel and Distributed Systems and Networks lab and director of PDSN lab (*PDSN*, www.pdsn.uniwa.gr) and co-director of the research unit on neuromorphic computing and photonics (rnep.eu).



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