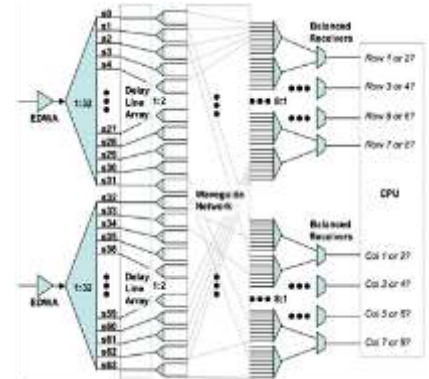


## "Photonic Signal Processing for Optical Communications Receivers"

**Dr. Antonio J. Mendez, Mendez R&D Associates**  
**Owner and Chief Technology Officer**

$M$ -ary pulse-position-modulation ( $M$ -ary PPM) is a power efficient communication scheme and so it is favored, for example, by NASA for its optical space links. In PPM, each time slot in a frame represents  $\log_2 M$  bits. At the receiver, detecting which slot is occupied determines the corresponding set of bits (using a look-up table, LUT). However, as the data rate and/or  $M$  become large the slots and frames become too short for electronic processing. This problem can be solved by using photonic signal processing wherein the time domain is mapped into the space domain, in effect representing the receiver as a logical focal plane array. Detecting which pixel in the virtual array is illuminated determines the coordinates of the time-to-space slot, hence uniquely determining the set of bits represented by the slot/pixel. Photonic signal processing can be further utilized so that the output of the receiver is the correct electronic bit sequence. In this talk we will describe the architecture and design of such direct translating PPM receivers for  $M = 4, 16$ , and  $64$  and data rates above  $1$  Gb/s. The corresponding performance is evaluated by means of numerical simulations that utilize the transfer functions of the components of the design.



**About our speaker:** Dr. Mendez has a B.A. from the Division of Letters, Arts, and Sciences at USC (1960) and a PhD in Physics from USC (1968). He had stints at Northrop Space Labs (now Northrop-Grumman), Martin-Marietta (Orlando; now Lockheed-Martin), and Hughes Aircraft Company (now Raytheon) as Senior Member of the Technical Staff, Senior Member of the Professional Staff, and Program Manager, respectively. He left Hughes in 1986 and formed Mendez R&D Associates. One of his gigs while developing the company was as Co-Principal Investigator (with Prof. Elsa Garmire) of the NSF Research Experience for Undergraduates (REU) and Research Experience for Minorities and Women (REMW) at the USC Center for Laser Studies (CLS). Prof. Robert M. Gagliardi of the USC Communications Sciences Institute (CSI) talked about Optical Communications to the REU/REMW—and Dr. Mendez was hooked.

**Wednesday, May 20, 2015**

**Reception: 6:00; Dinner: 7:00; Talk: 8:00**

**Cost: \$35. After May 17 - \$45**

**OSSC Student Members: free, \$15 after May 17.**

**Hilton Garden Inn**

2410 Marine Ave., Redondo Beach, CA 90278

On-line Registration: [www.osscc.org](http://www.osscc.org) or

Contact: Kenn Bates, [Events@osscc.org](mailto:Events@osscc.org),

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