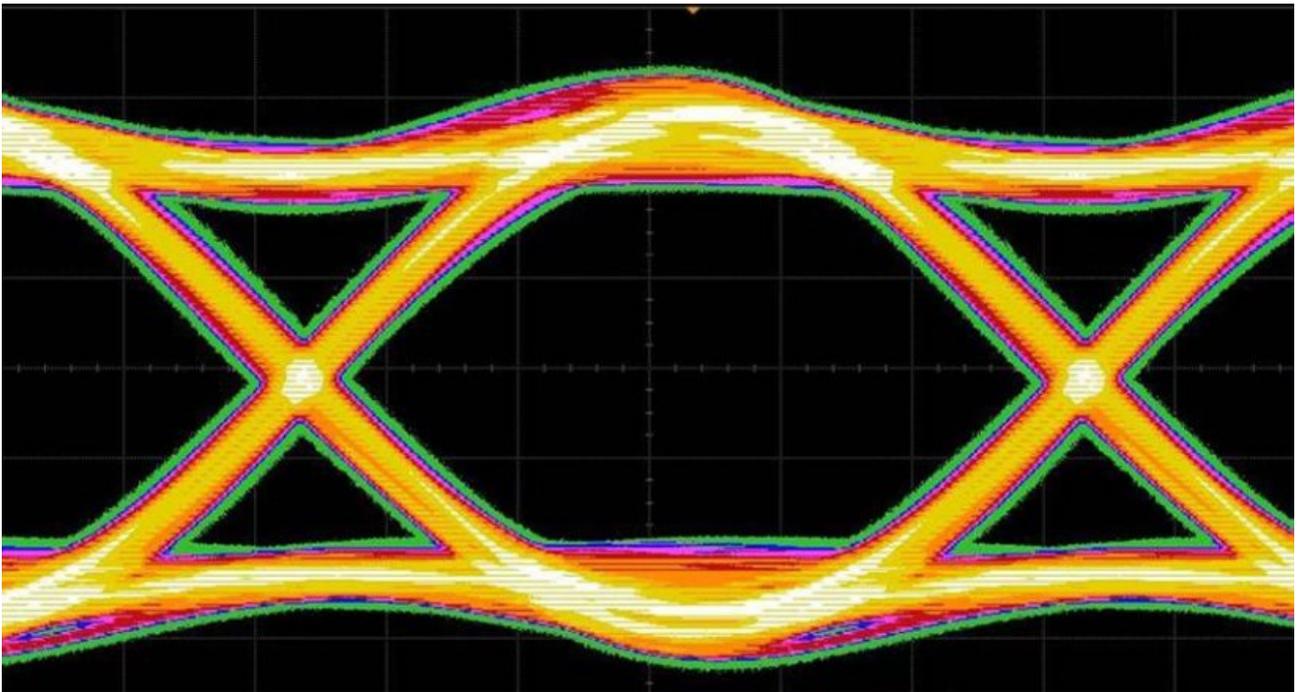


Topic for Diploma Thesis:

## **Design of a 1.2 Gbps Low-Power sub-LVDS Output Driver for CMOS Image Sensor Data Transfer**



The dominating limitation in increasing the video capturing rates in CMOS image sensors is the data conversion and data transmission from the image sensor to the image signal processing unit. Having an extremely fast array access time and data conversion is pointless if we cannot read out the converted by the column ADC bit-words outside the image sensor chip. This work focuses on the design of a >1.2Gbps, low-power sub-LVDS output driver, which is to be integrated on a chip bonding pad. Such high-speed interfaces are a necessity in almost every modern mixed-signal system, thus the relevance of this work is not limited to image sensors only. The student is expected to conduct an architectural exploration and design a full-custom sub-LVDS driver, based on predefined performance and load parameters. The latter should be also implemented into a driving bonding pad, thus, some area constraints should also be taken care of.

Photolitics owns a fast LVDS design able to operate at up to 1 Gbps, however, further improvements are needed to keep-up the innovation trend. Suggested target speeds include >1.2 Gbps, without a virtual upper-bound limit. To achieve this with our current architecture, new concepts need to be invented in both clock generation, data serialization and distribution, jitter

analysis, dynamic impedance matching circuits, pre-emphasis and equalization experimentation on existing FPGA devices and their clock receivers and PLL recovery circuits.

If you are enthusiastic in working on analog integrated circuit design, using state-of-the-art CMOS fabrication nodes and tools, you are very welcome to join our R&D design team where you would be guided and supported on a daily basis. Possible tasks for the design include theoretical modelling, practical circuit design, simulation, systems design, and layout. If the student is a fast-learner and is able to deliver a design matching with our testchip fabrication schedules, there is a possibility for inclusion of his own design with our test devices. This would lead to a thesis including a real chip fabrication and possibilities for evaluation and measurement. We also encourage outcome publications in highly-ranked scientific journals.

The thesis work can be combined with an internship, whose total duration can be flexible and subject to negotiations.

Additional information on the thesis topic can be obtained by Deyan Levski at [deyan.levski@photolitics.com](mailto:deyan.levski@photolitics.com)

---

### **About Photolitics**

Photolitics is a custom image sensor design house, specializing in industrial machine vision CMOS Image Sensor development, miniature medical endoscopic camera modules and mixed-signal ASIC design. We are a group of world-class IC design professionals with multi-decade experience in photonic IC design, CMOS Image Sensors and analog mixed-mode integrated circuits. Through our wide network of connections we distinguish ourselves as a small IC design house, with exciting opportunities for growth and professional development.

To find out more about us, visit our website: <http://photolitics.com>

---