

## “State-of-the-art active alignment technologies for camera module assembly”

**Daniel (Gruber) Winters, Trioptics, GMBH**  
**Research & Development Manager**

With an ever increasing sensor resolution of digital camera systems and corresponding increased requirements on the image quality of the objective lenses used, the correct alignment of optics and sensor during camera manufacturing becomes more and more important in order to achieve the best possible image quality.

In conventional manufacturing, typically only focusing and centering of the sensor is performed and other parameters like the tilt of the image plane of the lens needs to be tightly toleranced. This typically leads to low yield in mass production and increased cost pressure for both mass-production and high-end applications.

Quite recently, a trend has started where instead of relying on mechanical and optical tolerances, the optics and sensor are aligned in up to 6 axes (focus, x/y, lens tilt and rotation) based on in-situ image quality measurements as an active feedback mechanism.

In this talk the basic test metrology of measuring image quality via the modulation transfer function (MTF) using camera modules will be covered, followed by an overview of how the measurement data is used as a feedback mechanism during the assembly process of the camera module.



**About our speaker:** Dr. Daniel Winters received a Ph.D. (in Engineering Physics) from **Johannes Kepler Universität Linz** in Linz, Austria and was a Research Fellow at the University of Queensland, Australia and a Research Associate at the University of Edinburgh, Scotland. He has been involved in development of optical instrumentation at these universities before joining Trioptics in 2011.

At Trioptics, Daniel has been involved with the development of production and research-type instruments for testing of IR optics (image quality via MTF, lens centration) and with product management for the new instruments. For the past couple of years he has been the manager of two teams developing instrumentation for testing visible and infrared optics and for testing camera modules in high-volume end-of-line and R&D applications and provided product management for the new camera module testing range of instruments.

**Wednesday, February 18, 2015**

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

**Cost: \$35. After Feb. 15 - \$45**

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

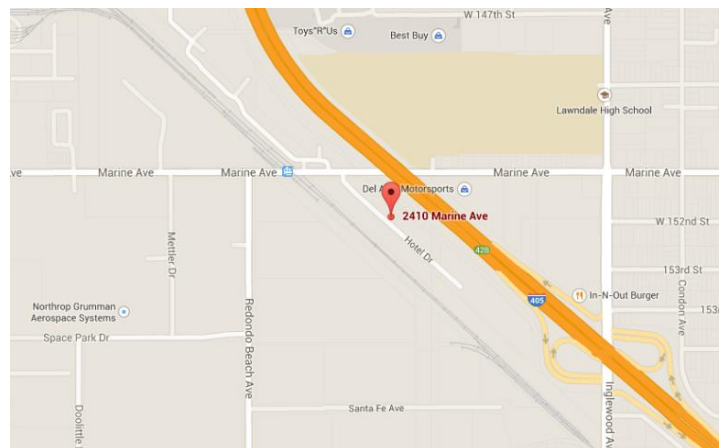
**Hilton Garden Inn**

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),

562-634-1435



**Please post this notice and invite your friends & colleagues to attend!**