



## **SEMINAR: Interference microscopy review & Industry update**

PETER DE GROOT

May 16, 2025

12:00 to 13:00

Seminar Room

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### **Industry update - how's it going in the world of Optics?**

Optics and Photonics is a thriving, growing, and resilient sector in the global high-technology ecosystem, spanning components such as lenses and detectors to complete systems that support over \$16T in enabled services worldwide. Foundational and emerging topics include optical freeform and meta-surface optics, extended-reality displays, biophotonics, photonics for sustainable energy and infrastructure, data services, quantum computing, and fundamental physics research. The sector has consistently grown at approximately twice the global gross national product and provides excellent jobs for talented professionals. Although prospects for continued growth are excellent, there are unusual challenges this year, with efforts to rebalance global trade, reforms to academic institutions, workforce reductions, and project cancellations. Here I review the state of the industry from the

perspective of SPIE, reflecting on some of these challenges while describing positive efforts to support and accelerate optics and photonics for the betterment of the human condition.

### **Interference microscopy-History, principles, and current research**

The story of modern interference microscopy is a journey through the history of optics, beginning with the discovery of interference fringes and leading up to present-day methods of surface structure analysis. For a time, after the invention of the laser, the principles of low-coherence interferometry were forgotten, as researchers raced to develop laser-based distance sensors. The rediscovery of white light methods in the 1990s dramatically advanced applications for high precision measurements using light waves, leading to modern interference microscopes that measure both smooth and rough surface topographies for research, development, and manufacturing metrology, for everything from engine parts to virtual reality headsets. Current topics include both practical instrument design as well as scattering theory applied to the interaction of light with surfaces.

### **BIO:**

Peter de Groot is fascinated by optics and its practical use for measuring things. Educated first in History then in experimental atomic Physics at the Universities of Grenoble, Maine, and Connecticut, he enjoys discovering the hidden links between academic and applied research that fuel inventions and creative solutions in science and industry.

Dr. de Groot joined Zygo in 1992, and has been Executive Director of Research, Chief Scientist, and now Scientist Emeritus for the company. His work has led to 141 US patents for optical instruments and 225 technical papers and book chapters. He is a Fellow of Optica and the Institute of Physics, and is the 2025 President of SPIE, the international Society for Optics and Photonics. His research interests include optical instrument theory and design, dimensional metrology, interferometry, and quantum methods of sensing and computing.

An experienced educator, Dr. de Groot has taught secondary school science in West Africa as well as advanced topics at universities in the USA and the UK, as well as professional development courses worldwide, as an instructor, adjunct professor, and honorary professor.

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**Hosted by:** Prof. Dr. Robert Sewell