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# Challenges for Compound Semiconductor Nanostructures in Future Commercial Applications

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**Venue: Billings Room 3.04, 3rd Floor**
School of Electrical, Electronic & Computer Engineering
The University of Western Australia, Crawley

This seminar is open to the public and admission is free to all IEEE members and non members.

## *Abstract:*

In the past 50 years the compound semiconductors, in particular the III-V's, were expected to replace Si as dominant material in semiconductor industry. However, for many reasons this never happened, and Si will continue to dominate for many more years. In this talk I will discuss some of the future prospects and challenges of compound semiconductor nanostructures in industry.
In addition to applications in light emitting devices, detectors, and power devices, due to their direct bandgap and low effective electron/hole mass, I see prospects and challenges of compound semiconductors to assist future CMOS technology in power constrained scaling, including operation at 0.5 V, optical data transmission, and memory technology with reduced energy needs. Further applications of compound semiconductors are wide-gap transparent electrodes, efficient photovoltaic cells, and thermoelectric devices. Finally, there is even an analog among the compound semiconductors to the famous graphene, namely molybdenum disulfide MoS(2).

## *Biography:*

Klaus H. Ploog is one of the pioneers of molecular beam epitaxy (MBE), a versatile tool to fabricate semiconductor and metal nanostructures, which has been established in the 1970s, i.e. long before the hype on „Nano" started to dominate the wordwide research funding policies in the late 1990s. Using molecular beam epitaxy, he has designed and fabricated numerous new semiconductor and magnetic nanostructures which have shown unique quantum size effects and which have led to a number of novel device concepts. His research achievements have been published in more than 1500 papers in international refereed journals, and he has received several prestigious awards. His current interest for the subject of this lecture evolved from his research on Group-III Nitrides for solid-state lighting, where he paved the way for more efficient blue, green and violet Nitride LEDs by using non-polar layers and heterostructures, and from his graduate teaching courses at Waseda University Tokyo (Japan).