

## Opportunities in III-V Semiconductor Solar Cells, Norbert Puetz

Explosive interest in solar and other renewable energy is being driven by concern over global warming, high oil prices, and geo-political instability. The solar energy industry has grown to \$15 billion and encompasses manufacturers and consumers worldwide. The diversity of solar energy solutions includes photovoltaic technologies such as wafer silicon; high-concentration photovoltaic using compound semiconductor devices; thin-film silicon, CdTe, and CIGS; and third-generation technologies such as organic PV and multiple exciton generation materials; as well as solar thermal technologies such as concentrator solar power. Electricity is the ultimate commodity and the relevant figure of merit is the total cost of generating electricity.

This Workshop will focus on CPV systems using multi-junction cells and will answer questions such as: What is CPV? Why have certain designs and architectures been chosen? What is the competitive landscape? This Workshop will address the technology and economics of multi-junction cells including cost, performance, design, and device physics. Manufacturing issues and opportunities will be thoroughly explored including similarities and differences between III-V PV and other III-V devices such as HBLEDs and GaAs ICs. This workshop will examine various manufacturing models including vertically integrated and fabless, and will look at the cost drivers in each.



Norbert is looking back on more than 20 years of experience working in the optoelectronic semiconductor industry. After achieving the Ph.D. in solid state physics (emphasis on semiconductor technology) from the Technical University of Aachen, Germany, he joined Bell-Northern Research in 1985 as a Member of Scientific Staff working in the development and characterization of III-V semiconductor epitaxial materials and processes.

In 1991 he became Manager of the MOCVD group at BNR, driving the introduction of their world class epitaxy processes into the manufacturing of Northern Telecom's leading edge optical

transmission products.

In 1999 he took the position of Sr. Manager within Nortel, overseeing the wafer production, material characterization and device failure analysis for Nortel's Optoelectronics operation, which later also included the entire optoelectronic wafer fab engineering team..

In 2004 Norbert joined Agility Communications in Santa Barbara, CA , USA, a maker of widely tunable lasers and transponders, where he held the position of Vice President Optical Components (Agility was acquired by JDSU in November 2005).

Since April 2006 he is involved in the fabrication of high efficiency triple junction solar cells as the Director of Semiconductor Fabrication with Cyrium Technologies in Ottawa.