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# Enabling a Revolution in Lighting: Light-Emitting Diodes



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**Abstract:** Semiconductor materials have enabled devices that assist us in a multitude of ways. During recent years, semiconductor materials have demonstrated yet another ability: The ability to generate high-quality white light with very high efficiency. Light-Emitting Diodes (LEDs) can be ten times more efficient than conventional light bulbs and three times more efficient than fluorescent lamps. As a consequence, we are entering a new era in lighting, in which LED-based lighting enables a cleaner and greener world. In this presentation, I will discuss the rich history, the formidable challenges, the enormous impact, and the unprecedented opportunities offered by LED-based lighting.

**Biography:** E. Fred Schubert received his Ph.D. in Electrical Engineering from the University of Stuttgart in 1986. From 1981 to 1985 he worked on compound semiconductor crystal growth at the Max Planck Institute for Solid State Research, Stuttgart, as a Member of Scientific Staff. During 1985 to 1995, he was a Post-doctoral Fellow, Member of Technical Staff, Principal Investigator, and Member of Management at AT&T Bell Laboratories in Holmdel and Murray Hill, New Jersey. In 1995, he entered academia, Boston University as a Professor of Electrical Engineering. In 2002, he joined Rensselaer Polytechnic Institute as a distinguished Professor, the Wellfleet Senior Constellation Professor, Future Chips with appointments in Electrical Engineering and Applied Physics. Since 2002, he is the Head of the Future Chips Constellation. He is the Founding Director of the \$ 40 million Smart Lighting Engineering Research Center of the National Science Foundation. E. Fred Schubert made pioneering contributions to the field of compound semiconductor materials and devices, particularly to the doping of compound semiconductors and to the development and understanding of light-emitting diodes. He is currently a distinguished professor at Rensselaer Polytechnic Institute in Troy NY. He authored the books *Doping in III-V Semiconductors* (1992), *Delta Doping of Semiconductors* (1996), and *Light-Emitting Diodes* (1st edition 2003 and 2nd edition 2006). He is co-inventor of more than 30 US patents and co-authored more than 300 publications. He is a Fellow of the APS, IEEE, OSA, and SPIE and has received several awards.