

Quo Vadis, MicroLEDs?

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Abstract: It is estimated that the industry has spent ca. \$7B on developing MicroLEDs for displays. At least one startup in the Silicon Valley is trying to leverage the MicroLEDs developed for display applications in chip-to-chip data communication. Recently, reports appeared on Apple's imminent implementation of MicroLED displays in smartwatches as evidenced by public announcements from Apple's MicroLED suppliers. Samsung has promised high volume production of MicroLED TV displays for about 5 years now. Google was reported to acquire a MicroLED startup in 2022 for estimated \$1B. Hundreds of startups are trying to address one aspect or the other in the supply chain. For those who have been in the semiconductor industry for 10s of years relate to this pattern: we are on the verge of having innovative microscopic light emitters participate in making the lives of humans better. In this talk, the promise and challenge of MicroLED emitters are discussed based on the speaker's hands-on experience with the technology. A number of innovative technologies necessary for high volume manufacturing of MicroLED-based devices are highlighted, with specific problems to be solved. It is an opportunity for researchers to participate in the science and technology development for this important technology.



Biography: Dr. Ahmed received a B.S. degree and an M.S. degree in electrical engineering from Ain Shams University, Egypt in 1991 and 1994, respectively, and a PhD degree in electrical engineering in 1998 from North Carolina State University. Dr. Ahmed joined Intel Corporation in 2015 where he is currently a senior principal engineer and the CTO of Systems Supply Chain organization. Before joining Intel, Dr. Ahmed was with Advanced Micro Devices, Inc., Conexant Systems Inc., Applied Materials, Inc., and Intermolecular, Inc., all in California from 1997 to 2015. Dr. Ahmed serves as a technical program committee member on Display Week Conference since 2016 and won the Semiconductor Research Corporation Best Industry Liaison in 2008. Dr. Ahmed has authored 175+ patents (granted & pending) covering technologies such as semiconductor devices, semiconductors manufacturing equipment, MicroLED device architecture, MicroLED display architecture, metasurface optical elements for display and photonics applications, and optical interconnects technology. Dr. Ahmed was awarded Intel Top Inventor Awards in 2021 and 2022. Dr. Ahmed is known for his strategic thinking and entrepreneurial spirit. He co-founded a company along with others working at JPL/NASA and University of Southern California targeting the manufacturing of III-V photodetectors on 300mm silicon wafers for LIDAR applications.