Roland Haitz

1935 – 2015

Dr. Roland Haitz, godfather and prophet of the last great revolution in lighting, has passed away at the age of 80 in Silicon Valley, his home for the last half-century. His predictions through Haitz's Law – the metric he formulated – and his personal efforts in securing national funding for developing a then-nascent LED technology, helped to usher in a solid-state lighting revolution that has since encompassed the globe.

Haitz's Law is the equivalent for LEDs and lighting what Moore's Law is for transistors and integrated circuits. It states that every decade, the amount of light output by an LED (measured in lumens) increases by a factor of twenty while the price per lumen falls by a factor of ten. In formulating this, Dr. Haitz was the first to grasp the potential for massively reduced energy consumption and correctly predicted the time-scale and degree to which light-emitting diodes (LEDs) would triumph over all other lighting technologies in efficiency and cost. Like Moore's Law, his predictions for LEDs were so accurate that they guided the investment and R&D strategies of the solid-state industry, initiating and sustaining an on-going transformation in lighting that has progressed from his personal vision to global revolution, all in just the last 15 years.

But he was not merely an observer of the changes to come. Dr. Haitz was one of very few visionaries who was equally fundamental in creating the technologies and the institutions upon which his vision would be based. Realizing that the young industry did not yet have the resources to realize the LED's true potential, he joined forces with Dr. Jeff Tsao and others from Sandia National Laboratories to make the case for a national program of technology development that would lead to the ideal white light source. First delivered by Dr. Haitz personally in Washington DC in 1999, *The Case for a National Research Program on Semiconductor Lighting* is considered the seminal work on the application of LEDs to solid-state lighting. In so doing, he threw down the initial gauntlet that the world was ready for LED-based lighting, and through Haitz's Law provided the roadmap. Within months of the paper's publication, calls for similar national government-industry initiatives went out overseas including Korea, Taiwan, and China. In 2005, the US Energy Policy Act authorized funding of up to $50 million per year into the next decade … just as outlined in Dr. Haitz's proposal. For this and other contributions, Dr. Haitz was the recipient of many honors and awards, including (together with his former HP colleague Dr. George Craford) the prestigious 2007 Economist Innovation Award for Energy and Environment.

Mentored by such scientific titans as Nicholas Riehl, one of the inventors of the modern fluorescent tube, and Nobel Prize winner William Shockley, co-inventor of the transistor, Dr. Haitz first cut his teeth on three decades of creative leadership in optoelectronics at Hewlett-Packard and its offspring, Agilent and Avago. During this time, he personally catalyzed or helped make possible everything from the early hand-held HP calculators, to the billion

dollar industry of solid-state automobile signal lights, to the ubiquitous seven segment numerical displays found everywhere in today's electronic equipment.

With an already solid background in solid-state electronics and his more than passing facility with optical applications, Dr. Haitz came to the realization that the future of LEDs lay in general lighting following a tour of Philips Lighting's laboratories in Holland. In 1999, he persuaded HP's management to establish Lumileds as a joint venture with Philips. Lumileds quickly became a leading manufacturer of LEDs in the world, and remains so up till this day.

However, even as he helped chivvy in the age of solid-state lighting (SSL) based on economics, Dr. Haitz realized there was an even greater opportunity offered by LEDs – one that had not been possible with any previous light source. To realize this opportunity Dr. Haitz, age 76, joined an ambitious Silicon Valley start-up in solid-state lighting, QuarkStar. His personal goal: to create lighting's equivalent of the integrated circuit – much as his fellow Shockley alums had done 50 years earlier in electronics – for Dr. Haitz was well aware that the electronics revolution of the 20th Century came not from the individual transistor by itself, but from the IC – the integrated circuit. In the case of lighting it would allow artificial light to be manipulated and integrated into people's lives as never before imagined.

Over the next 4 years - a quarter of his 16-year career in the SSL industry – he would team up with fellow luminaries and up-and-coming younger talent within QuarkStar to create an overarching integrated optics approach that has won both government and industry awards before the technologies were even presented to the public. Personally filing 10 patent applications during this time, he submitted the last of his 50 total lifetime patent applications just three months before his death, aged 80. His last paper, published in the prestigious European journal *Annalen der Physik* just days before his passing, was an invited co-authorship presenting technical commentary and historical context on this year's Nobel Prize in Physics for the invention of the bright blue LED.

His last remarks on solid-state lighting, made at the same time, underscore the progress to come: "Solid-state lighting is where the internet was in the 1980's. Just as we could not then have predicted what the internet is now, 30 years later, we cannot foresee all that light and lighting will become in the next decades. We know simply that it will be wondrous and beautiful."

Dr. Haitz is survived by his wife and true partner of 49 years, Bente Haitz. He has two children, Lars and Kirsten, and three grandchildren.

For more information on Dr. Roland Haitz and Haitz's Law:

http://www.QuarkStar.com/Roland_Haitz

Info@QuarkStar.com