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# Failure Analysis: Current Trends in Consumer Electronics

## Abstract

This talk will discuss failure analysis and the latest trends in this ever-changing field, with a special emphasis on consumer electronics and computer science. Failure analysis involves applying engineering and scientific principles to answer questions from clients such as “What went wrong?,” “How?,” and “Why?” Projects can range and include the following: new algorithm development for implantable medical devices; circuit analysis for failed power adapters; source code analysis and reverse engineering for IP litigation; root cause of catastrophic Li-ion battery failure; defect analysis on light-emitting diodes (LEDs) and electrocution or fires caused by high-power electrical lines and fixtures. Real-world case studies will be presented with a chance for audience members to test their forensic skills.

## Biography

Dr. Lau is currently employed at Exponent, Inc., a leading engineering consulting firm headquartered in Menlo Park, CA. There, he currently manages the optical characterization lab and runs a practice that encompasses the areas of consumer electronics, lasers and LEDs, rapid prototyping, and optical characterization. His experience covers a wide range of areas, including optics, optical devices, semiconductor devices, analog communications, micro- and nano-fabrication. He has over 10 years of experience in the design, characterization, modeling and simulation of high-speed electronic, optoelectronic devices, and optical systems.

At Exponent, Dr. Lau has performed design, risk analysis, and failure analysis of solid-state lighting, liquid-crystal displays (LCDs), light-emitting diodes (LEDs), lasers, ocular biomedical devices, optical lens, and multi-layer transmissive optical systems. He has extensive experience in optical metrology, colorimetry, luminance, reflectance, quantification of visual defects, and cosmetic appearance of surfaces of all types. Dr. Lau has performed laser and LED radiation safety analysis for numerous consumer electronics and medical products. Dr. Lau has extensive experience in consumer electronic failure analysis. Some of his notable investigations include flexible printed circuit (FPC) failures; PCB failures due to component failure, tin whiskers, etc.; laser failures; and adhesive and conductive epoxy failure. He has extensive experience with switching-mode power converters, especially electrolytic capacitor and PWM failure. He has investigated the failure of aniosotropic conductive adhesives.

In the area of fiber optic telecommunications, Dr. Lau holds the record for developing the highest bandwidth directly modulated laser at the University of California, Berkeley, as well as the record for highest directly measured resonance frequency. He also helped develop optoelectronic oscillators at microwave and millimeter-wave frequencies for RF photonic applications. While at MIT, he developed a novel finite difference time-domain method for simulating the time-domain response of ultra-fast pulses from mode-locked lasers.