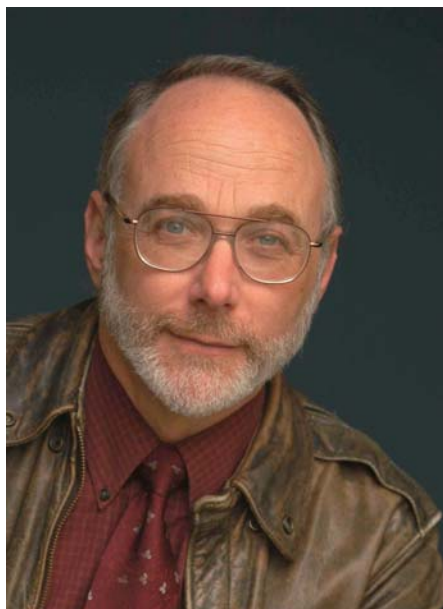
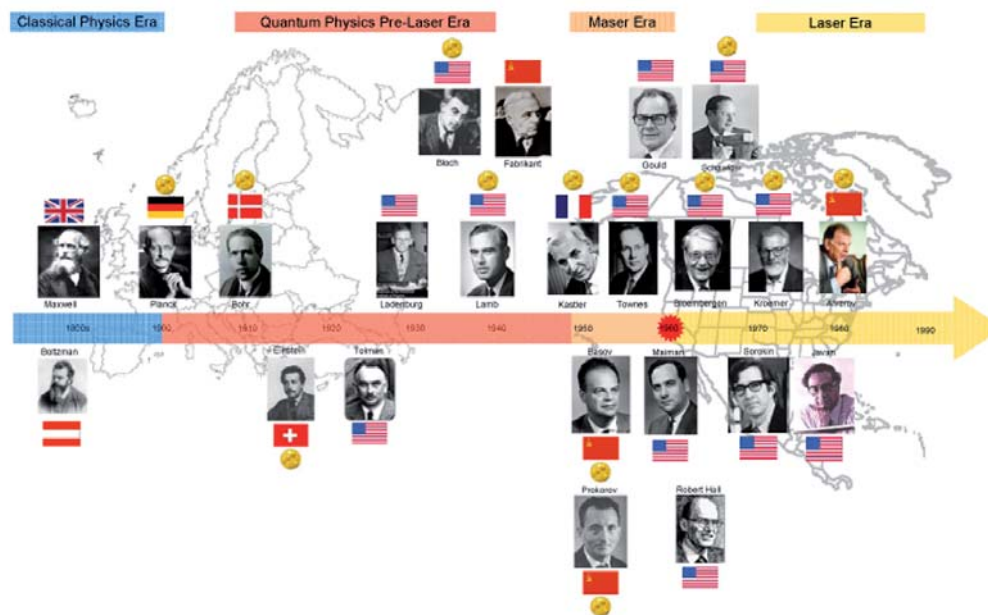


The Laser Past, Present, and Future: A Prime Example of Sustainable Innovation



Dr. Thomas Baer
Executive Director
Stanford Photonics Research Center
Stanford University



3:00 pm, Monday, Dec 6, 2010
Sloan Auditorium, Goergen 101
Refreshments provided.

This talk will describe how the laser evolved in fifty years from a simple yet elegant laboratory curiosity to a manufacturing workhorse upon which a major fraction of the USGDP depends. Possible future laser applications will be described which illustrate the continually expanding importance of this revolutionary invention.

The Laser Past, Present, and Future: A Prime Example of Sustainable Innovation

Thomas Baer, Stanford University

Abstract: Within fifty milliseconds, fifty years ago, a simple but elegant device conceived and assembled from off-the-shelf components switched on, initiating a world-changing event. Born out of fundamental curiosity, in a cauldron of competition and creativity, an invention tracing its roots to investigations of the incandescent light bulb and the need for improved radar sources, the laser initially appeared to solve no pressing world problems. In spite of its relatively unheralded birth and early years the laser today represents one of the best examples of the successful evolution of scientific theory and experiment into transformative technology upon which present day civilization critically depends. I will review the evolution of the laser, from concepts originally developed by Maxwell and Boltzmann in the era of classical physics, subsequently transformed by Planck and Einstein into some of the early successes of quantum theory, and finally applied by Townes, Schawlow and others to predict the possibility of powerful, coherent sources in the visible spectrum. From a laboratory curiosity to a manufacturing workhorse that helps produce many items we use daily and which encodes and transmits almost all of the real time information we receive, the laser is an invisible, often unrecognized enabler. I will describe how a major fraction of the USGDP depends on the laser and discuss examples of future laser applications which illustrate the continually expanding importance of this revolutionary invention.

Biography: Dr. Baer is the Executive Director of the Stanford Photonics Research Center and a member of the Applied Physics Department at Stanford University. His current research is focused on developing imaging and analysis technology for exploring the molecular basis of developmental biology and neuroscience.

From 1996 to 2005 Dr. Baer was the CEO, chairman, and founder of Arcturus Bioscience, a biotechnology company located in Mountain View, CA, which he established in 1996. Arcturus Bioscience pioneered the area of Microgenomics by developing and manufacturing laser microdissection instrumentation and integrated bioreagent systems. Arcturus developed products that allowed precise genetic analysis of microscopic tissue samples and which were integrated by the company into a new generation of cancer diagnostic tests. Prior to Arcturus, Dr. Baer was Vice President of Research at Biometric Imaging, where he led an interdisciplinary group developing products with applications in the areas of AIDS monitoring, bone marrow transplant therapy, and blood supply quality control. From 1981 to 1992 Dr. Baer was at Spectra-Physics, Inc., where he held positions as Vice-President of Research and Spectra-Physics Fellow. While at Spectra-Physics his research focused on ultra-fast lasers, optical pulse compression, diode-pumped solid-state lasers, and non-linear optics.

Dr. Baer has made major contributions in the areas of biotechnology, quantum electronics, and laser applications, has over 60 patents, and is co-founder of four companies in Silicon Valley. Dr. Baer graduated with a BA degree in Physics Magna Cum Laude from Lawrence University and received his MS and Ph.D. degrees in Atomic Physics from the University of Chicago. He is also an alumnus of Harvard Business School. He is a fellow of the American Association for the Advancement of Science and The Optical Society of America (OSA), and served as the President of OSA in 2009.