

## Optics in the 21st Century

D. C. O'Shea

SPIE President and Professor of Physics, School of Physics

Georgia Institute of Technology

Atlanta, GA 30332 USA

doshea@prism.gatech.edu

Although it is difficult to predict the future engineers, including optical engineers, must do it on a regular basis. After all, what is the generation of a new optical design, but an attempt to predict what will be needed next year? But optical engineers do not consult oracles or look into crystal balls, instead they look at past history, new research, and the trends in technology. This talk will use this approach to look at where optics will take us in this new century.

I will look at several device and application areas including Information Technology and Telecommunications, Health Care and the Life Sciences, Optical Sensing, Aerospace and Defense, Manufacturing, and Entertainment. In this century photonics and optical technologies will replace electronics in many application areas. Currently the best example of this is the replacement of copper cable with optical fiber. In the near term optics will have a growing impact in diagnostic and therapeutic medicines. The nature of display devices will change from incandescent lamps to many specialized solid state devices. And optics will contribute significantly to process control in manufacturing and materials processing. The next generation of intelligence, surveillance, reconnaissance, and communications systems for defense will be based on the work of optical scientists and engineers.