

A Toast! To the International Year of Light

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A Toast! To the International Year of Light

By Michael Bass
UCF Forum columnist
Wednesday, July 29, 2015

December 2013, at the United Nations' 68th General Assembly meeting, the assembled countries could not as usual solve the problems of world conflicts, human slavery, widespread famine and the Israeli-Palestinian question. So, it decided to do something it could: It declared that 2015 would be the International Year of Light.

I am quite sure that not many at UCF would know that about 2015, with the exception of those at CREOL (UCF's Center for Research and Education in Optics and Lasers), the College of Optics & Photonics, a few in the College of Engineering & Computer Science, and some in the Science departments.

We live in a world made possible by light.

Our science and engineering of light and light technology have made it so reliable and ubiquitous that most people don't think about how important it is.

With 2015 being the International Year of Light, events are being held around the world celebrating light and light technology. CREOL, UCF's Center for Research and Education in Optics and Lasers, has emphasized it in its annual Industrial Affiliates meeting and when K-12 groups visit.

As part of this yearlong observance, I encourage everyone at UCF to be more of a player in *light* and promote the optics industry. The university already has shown leadership through the establishment of its College of Optics and Photonics, the first college in the nation devoted to the subjects of light and photonics. The subjects *are* emphasized at some other U.S. universities, but generally within traditional departments. UCF was the first to give it the prominence it needed.

Perhaps we could plan light art shows on campus and off, or maybe one or more halftime programs could be light shows?

Light and the science and engineering of light deserve recognition, and here is why:

Let's start with the obvious. Our homes and workplaces are illuminated by artificial light sources. These have evolved from Edison's hot tungsten filament to the much more efficient compact fluorescent light bulbs and LED lights that are now gaining wide acceptance. So when you flip the switch to turn on a light you are experiencing a modern miracle of light.

An added benefit of improved lighting efficiency is a much-reduced heat load on our air conditioners. If you picture yourself as concerned for the environment, get rid of the old bulbs and install the new types. You have a chance to be consistent and do something for the environment just by installing more efficient lighting. It is easy to do and has an immediate impact.

Another example of light technology: Just imagine life without the bar code scanner in the grocery store.

A few years back my wife and I were in Venice, Italy, and stopped to buy some items in a small store that rang up items by hand. We found what we wanted, got in line to pay, and waited behind about 40 people for nearly 35 minutes while everyone's purchases were totaled. This proved my philosophy: "There were no good old days, just old days."

Consider the ever-present cell phone. Its components, the electronic chips and the liquid crystal display, can only be manufactured using ultra-high precision laser and optical equipment. The LCDs in cell phones, computers, televisions and autos are optical devices; a major modern light technology you would not want to be without.

In my opinion the most overlooked contribution of light to modern life is the worldwide optical communication system. It is made possible primarily by two critical optical devices: the diode laser and the fiber optic.

In 1966, electrical engineer and physicist Charles K. Kao published a paper on the concept of light confined in optical fibers for communications that would win him the 2009 Nobel Prize in Physics. Kao recognized that light would provide the required

spectral bandwidth and suggested how to make an optical communications system. Every time you make a telephone call or use the Internet, you can thank him.

In 1970, the Corning Company was able to make an optical fiber with low enough loss so that it could confine laser light and transmit it over long distances. Engineers at Bell Laboratories found out how to make the diode laser rugged and reliable.

The stage was set for some sort of demonstration of optical communication.

It came in 1980 when two miracles took place emanating from Lake Placid, N.Y. The setting was the Winter Olympics, and in one miracle the U.S. Men's Hockey team defeated the Soviet Union team. The other miracle was that the television broadcasts of those Olympics were transmitted on an optical fiber communication system.

Today, there are nearly 2 billion kilometers (about 1.25 billion miles) of optical fibers in the ground or under the seas, and hundreds of millions of diode lasers generating the light that carries the information that is your voice or your Internet chatter.

We use light to do our work, to communicate, to grow our crops, to entertain us and to keep us healthy. We should pay more attention to this important aspect of the modern world.

So tonight when you open your refrigerator to get a drink, pause for a moment and toast that light that is always there to help you find what you're looking for.

Michael Bass is a professor emeritus of optics at CREOL (Center for Research and Education in Optics and Lasers) in UCF's College of Optics & Photonics. He can be reached at bass@creol.ucf.edu.