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Introduction

This year, we are proud to present the first-ever SPIE Proceedings volume on a new conference on *Optics and Biophotonics in Low-Resource Settings*. This conference is a huge development for SPIE's Photonics West meetings, and in the optics community in general. For several years now, Photonics West has been the leading biomedical optics conference in the world. However, the bulk of the research presented at Photonics West came primarily from leading labs in OECD countries, focusing on pushing the boundaries of science by improving the spatial resolution of optical coherence tomography, developing multi-modal endoscopes for imaging a host of internal tissues, spectroscopy, optogenetics, photodynamic and low-light therapies. Until very recently, R&D in biomedical optics consisted almost exclusively of innovations of such high-end systems.

However, recent developments in technology have changed everything. The revolution in digital electronics has significantly reduced both the price and size of sensors, light sources, and computing units. With the smartphone, mobile imaging systems have been placed in the hands of billions of people. Indeed, the cameras in smartphones have better specs than many of the cameras in high-end medical imaging systems. Prototyping has become faster and easier. Not only can mechanical structures be printed inexpensively in 3D, but now, so can lenses and other optical elements. Innovations in nanotechnology and microfluidics enable rapid optical analysis of liquid specimens collected from any or all bodily fluids. With these trends, many believe that growth in healthcare technologies in the future will be based on innovative low-cost solutions that bring healthcare to the masses, which currently lack access to it.

Approximately 85 percent of the world's population (6 billion people) lives outside OECD nations, where resources and facilities available to deliver medical care are limited. Optical technologies are uniquely positioned to enable emerging economies to improve the delivery of healthcare to their people. Optical methods can non-invasively assess the microstructure, function, and composition of tissues, as well as deliver targeted therapies. The revolution in digital electronics has significantly reduced both the price and size of components (e.g., sensors, light sources, computing units) critical to most optical systems. Integrating such optical components with compact microfluidics and low-cost biomarkers allows for building robust optical systems that are inexpensive and scalable.

Attendance at the conference was very impressive. In every single session, the room was overflowing with people, including many leading investigators from the labs that develop high-end systems. We sincerely hope that this conference gets people thinking on how to use optical technologies to improve healthcare for the billions of people on the bottom of the pyramid.

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